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THE TRANSACTIONS OF THE LINNEAN SOCIETY OF LONDON.

VOLUME XI.

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MISSOURI
BOTANICAL
GARDEN.

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EXTRACTS

EXTRACTS
FROM THE MINUTES OF THE COUNCIL
OF
THE LINNEAN SOCIETY OF LONDON.

April 28, 1812,

AYLMER BOURKE LAMBERT, Esq. V.P. in the Chair,

THE Secretary read a Letter from the Right Hon. John Mac Mahon, Private Secretary to His Royal Highness the PRINCE REGENT, addressed to the Lord Stanley, and dated the 12th of this month, acquainting his Lordship, for the information of the Linnean Society, that His Royal Highness had been graciously pleased to declare his intention to become Patron of the Society.

The Secretary afterwards reported that the President (who is prevented by indisposition from attending the Meeting this evening) was presented to the PRINCE REGENT at the Levee on the 22d of this month; and that His Royal Highness had received him very graciously. The President was at the same time informed by Colonel Mac Mahon, that it would be proper for the President, with a Deputation of the Society, to wait upon His Royal Highness at a future Levee, for the purpose of getting His Royal Highness's Signature in the Charter-Book of the Society.

Resolved—That a Committee be appointed to prepare an Address of Thanks to the PRINCE REGENT, for his gracious offer of becoming Patron of this Society; and that the President, the Vice Presidents, the Lord Stanley, Mr. Rudge, and the Secretary, be the Members of this Committee.

June

June 22, 1812,

William George Maton, M.D. V. P. in the Chair,

The Draft of an Address, proposed to be presented to the Prince Regent, was read, and approved, as follows:

"To His Royal Highness George Prince of Wales, Regent
"of the United Kingdom of Great Britain and Ireland,

"The humble Address of the President and Fellows of the
"Linnean Society of London.

"May it please Your Royal Highness,

"We His Majesty's most dutiful and loyal subjects, the President and Fellows of the Linnean Society, beg leave to approach Your Royal Highness with our most grateful acknowledgements for the distinguished honour which Your Royal Highness has been graciously pleased to confer upon the Society, in becoming its Patron.

"Whilst, in common with every other class of His Majesty's subjects, we reflect with heartfelt concern on the afflicting illness of our venerable Sovereign, it is with unfeigned admiration that we contemplate the filial respect which marks Your Royal Highness's administration of the supreme authority, and your protection of those useful arts and sciences, the prosperity of which has shed so bright a lustre on His Majesty's reign.

"It is with pride, Sir, that the Linnean Society will cherish, in lasting and dutiful remembrance, the name of Your Royal Highness as their Patron, united with that of your Royal Father as their Founder."

The President being still prevented by indisposition from attending the Meetings of Council, and from waiting on the Prince

Prince Regent with a Deputation of the Society, as proposed, for the purpose of presenting the Address, and procuring His Royal Highness's Signature in the Charter-Book,

Resolved—That a Letter from the Secretary be written to the Right Hon. John Mac Mahon, notifying the above circumstance, and expressive of the regret of the Council at having been so long prevented, by the illness and consequent absence of the President, from having the honour of waiting on His Royal Highness, humbly to solicit his Signature in their Charter-Book, and to express their gratitude for the very high honour conferred upon the Society by His Royal Highness.

Resolved—That a page of the Charter-Book, for the Prince Regent's Signature, be ornamented with the Royal Arms, the Armorial Bearings of the Society, and botanical Devices.

April 20, 1813,

The President in the Chair,

Resolved—That the President do communicate with the Right Hon. John Mac Mahon, to ascertain when His Royal Highness the Prince Regent will be pleased to receive the Deputation of the Council, for the purpose of obtaining His Royal Highness's Signature to the Society's Charter-Book.

May 4,

The President in the Chair,

The President reported, as the result of the communication which he was requested to make at the last Meeting of Council, That the Prince Regent will receive the Deputation of the Society at the next Levee; and that it is expected that the Vice Presidents, the Secretary, and such Members as have been already presented to His Royal Highness, do attend on this occasion.

June

June 15, 1813,

The President in the Chair,

The President reported, that he, with the Bishop of Carlisle and Dr. Maton, Vice Presidents, and the Secretary, had waited on the Prince Regent at the Levee, on the 20th of May, and presented to His Royal Highness the Address of Thanks voted by the Council on the 22d of June last; and that the Charter-Book had been signed by His Royal Highness, as Patron of this Society.

The President having waited upon the Prince Regent, at the Levee, on the 28th of July, 1814, in order to present to His Royal Highness, on the part of the Linnean Society, a set of their Transactions, the honour of Knighthood was conferred upon him as Institutor and President of the Society, at the recommendation of Lord Viscount Sidmouth, Secretary of State for the Home Department.

TRANSACTIONS

OF THE

LINNEAN SOCIETY.

I. *Descriptions of several new or rare Animals, principally marine, discovered on the South Coast of Devonshire. By George Montagu, Esq. F.L.S.*

Read April 7, 1807.

CANCER.

Cancer Hippa septemdentatus.

Tab. I. Fig. 1.

Thorax suborbicular, smooth, with a slightly embossed urn-shaped impression: front obtuse, tridentate, the sides serrated with seven denticulations each, besides those which guard the eyes: antennæ two, hirsute, not so long as the thorax: arms very broad, and somewhat compressed, ciliated with long hair of a yellowish cast: the fixed claw turns outwards: the thumb is hooked, and stands much oblique when closed: these are of a dusky colour, and bluntly toothed: the two extreme joints of the arms are minutely verrucose, the roughened parts somewhat disposed in rows, particularly on the hand, where seven distinct lines are observable; on the top of the wrist a small blunt spur: legs eight, subulate, the hindmost pair a little compressed, all

more or less margined with long hair: tail small, nearly cylindric, the extreme joint acutely pointed. Diameter above one inch and a quarter.

Several of these crabs were taken in deep water by the trawl, all of which are evidently males; they were when fresh, though not alive, of a pale colour clouded with light ferruginous.

It is probably an inhabitant only of the deep, and difficult to be obtained, I having in no other instance been able to procure it.

I have not been able to fix any synonyms to this species; nothing in Gmelin in the division to which it belongs can be referred to.

CANCER BIACULEATUS.

TAB. I. Fig. 2.

Thorax ovate, gibbous, the front armed with two very long spines that form the proboscis; these are very close together, declining a little, and diverging at the points: over each eye is a short and broad spine, and two smaller immediately behind: on each side near the posterior end is a large spine pointing obliquely upwards: the elevations and depressions upon the top of the thorax are not easily defined, but along the middle is an undulated ridge running to an obtuse spine at the posterior end: antennæ shorter than the proboscis: arms slender, and not so long as the anterior legs, destitute of spines, but tuberous about the joints; the fangs small and denticulated: legs eight: claws subulate, slightly hooked, and furnished beneath with minute denticles: tail small, obtusely pointed.

The shell of this crab is livid white, but is mostly concealed by a thick covering of short curled hair of a yellowish brown colour, the tips of the claws excepted: when this is removed, the shell appears under a lens full of punctures. Length an inch and a quarter, breadth three quarters of an inch.

I have

I have only been able to procure one specimen of this crab, which is a male, and was taken in the trawl at a considerable distance from the shore. It has much the habit of *C. tetraodon*, but is not so broad in proportion, is more gibbous, destitute of the lateral spines; and the lengthened one over the eyes, so conspicuous in that species, is in this very short.

Cancer Gammarus spinosus.

Tab. II. Fig. 1.

Body rather ovate, not much compressed: the colour when alive is of a deep red-brown, and highly glossy: antennæ four, setaceous, superior pair longest, and about half the length of the body: joints of the body, including that to which the caudal bristles are fixed, eleven: arms (if so they can be termed, being shorter and smaller than the legs,) two pairs; these do not appear to be subcheliferous, but formed like the legs; and being destitute of the usual anterior legs, independent of those which are placed forward in the situation of arms, it might with propriety be described to be destitute of arms: posterior legs three pairs, which as well as the others are spinous: body smooth: the four posterior plates are subcarinated, and terminate behind in a spine. the sides of the same plates also shoot into a spine at the lower exterior angle: natatorial fins beneath the abdomen two pairs; and three pairs of subulate caudal fins, the posterior pair of which are bifid.

Length three quarters of an inch.

I am not enabled to fix any synonyms to this species, which is one of those that connect the *Cancer* and *Oniscus*. It appears to inhabit the open sea, and is frequently dragged on shore amongst marine plants and *Zoophyta* in the nets, especially at Torcross.

 Doctor

Doctor Turton describes a species of *Cancer gammarus* from the British Museum under the title of *carino-spinosus,* which in some respects accords with this; but as half a dozen words convey so little, and the size is omitted, I dare not refer to it.

It may be proper to remark, that in the figures given of this and the following *Cancri,* the legs only on one side are shown, to prevent confusion in these magnified species, except in figure 6.

CANCER GAMMARUS GALBA.

TAB. II. Fig. 2.

Body ovate, somewhat elongated at the tail, smooth, glossy, and when alive of an olive-green minutely speckled with brown, but by drying becomes rufous-brown: antennæ of the male remarkably short; in the female two pairs extremely long, and slender, nearly equal to the length of the body: joints of the body, independent of the head, and the joint to which the caudal fins are attached, eleven: the head is large, and much resembles that of a maggot, and in the male appears to have no division between the eyes, but a continuation of the same transparent membrane covers the whole: the eyes of the female are very large, but distinctly marked by a division: the two pairs of anterior legs, like those of *C. spinosus,* are small, and not subcheliferous, but occupy the place of arms, and scarcely differing in any respect from the other five pairs, all of which are furnished with a very small claw: abdominal fins three pairs; caudal fins five, flat, and bifid; the middle one very broad, concealing the others which are capable of spreading laterally.

Length half an inch or more.

The female is rather more slender in the body, and does not so suddenly decrease towards the tail: the eyes, as before mentioned, are distinct, and are of a bright red when alive, reticulated,

and

and marked with two streaks of black, one on each side the eye, probably the reflection of a pupil.

This is another species of *Cancer* that very nearly approaches the genus *Oniscus*, and is readily distinguished by the larva-like appearance of its head. It is not uncommonly taken with the last.

Cancer Gammarus monoculoides.

Tab. II. Fig. 3.

Body slender, compressed, with ten smooth joints of a pale colour, the seven first connected with a broad plate on each side of an oval shape, which appears capable of closing, and receiving all its external members, such as the legs, antennæ, and probably the caudal fins: no visible arms, but it has several pairs of legs armed with slightly hooked subulate claws: antennæ four, the upper pair rather the longest, and about half the length of the body: eyes very minute: caudal fins three pairs, subulate.

Length one eighth of an inch. Not common.

This species seems to connect the *Cancer* with the *Monoculus*, but is more allied to the former in the conformation of its members.

Cancer Gammarus obtusatus.

Tab. II. Fig. 7.

Body slender, compressed, with eleven smooth joints, independent of the head, and of a pale brown colour, usually mottled with rufous-brown when alive, especially about the legs: antennæ four, the superior pair nearly as long as the body, the others somewhat shorter: eyes very small, and of a pale colour: arms four, the anterior pair very small; the others are furnished with large hands differing a little in different specimens; but the claw, which is a little hooked, is always obtuse at the end, and sometimes

times clavate: this claw closes upon the edge of the hand, in some between a double row of teeth; in others destitute of teeth there is a single denticle that receives the end of the claw: legs ten, the two anterior pairs smaller than the others: caudal fins three pairs, the lower pair shortest, and all subulate: on the top of the exterior margin of the four posterior joints are two or three small spines.

Length three eighths of an inch. Taken in Salcomb bay, but not common.

Cancer Gammarus pedatus.

Tab. II. Fig. 6.

Gammarus pedatus. *Mull. Zool. Dan.* iii. *t.* 101.

Body linear, with seven divisions or joints including the head; the first two are furnished with a pair of arms each and subcheliferous hands, the claws being long, hooked, and folding upon the hands; the anterior pair is smallest; the posterior pair is armed with a small spine on the hinder part of the hand, that meets the claw when closed: the other five joints of the body are each furnished with a pair of legs; those on the two posterior joints are the longest, and the shortest pair is fixed to the fifth joint; all these are armed with subulate claws: at the base of the hindmost pair of arms, and the two pairs of foremost legs, are two small oblong scales or vesicles; antennæ four, the two superior half as long as the body; the inferior shorter by one half: at the mouth a minute pair of palpi: eyes sessile, reticulated, and of a crimson colour: the body and legs cinereous-green speckled with purplish red.

Length including antennæ less than one inch.

Found amongst Confervæ at the Salt Stone, very scarce.

Muller has given a tolerably good figure of this species; but

by

by some mistake the two first joints are undivided, so that the two pairs of arms appear to originate from the same articulation: there are also, in his, four minute appendiculæ at the extremity of the posterior end. This could not be discovered in my specimens, and is probably a sexual distinction.

The same author refers with doubt to *C. linearis* of Linnæus for his *pedatus*, but it really is quite impossible to decide a matter so much in obscurity*. For the Linnean *C. atomos* Muller refers his *Squilla quadrilobata*, the *Cancer Phasma* of the sixth volume of the Linnean Transactions, and seems to conjecture, that, as well as *filiformis* and *linearis*, may be the same.

I do not know that this has been described by any author previous to Muller, and it is, I believe, hitherto unknown to be British. It differs from *C. Phasma* in several particulars, but essentially in possessing ten instead of six legs, the two middle joints of the body in that species being destitute of any.

This has also three pairs of abdominal vesicles, whereas the *C. Phasma* has but two pairs, and those differently shaped.

PHALANGIUM.

Phalangium Acaroides?

Tab. II. Fig. 4.

Phalangium acaroides. *Gmel. Syst. p.* 2944.—*Turt. Lin.* iii. *p.* 717.
Chelifer americanus? *Degeer Ins.* vii. *p.* 353. *t.* 42. *f.* 1. 2.

Body oblong, truncated at the posterior end: thorax smooth, glossy, the other part divided into eight joints beset with hairs:

* Dr. Shaw considers that this can be no other than the *Cancer linearis* of Linnæus, first described, perhaps, by Baster in the Philosophical Transactions, vol. 50, under the title of *Mirum animalculum inter Corallinas degens*, and figured, both in its natural size and magnified, in the same volume. The annexed figure is the most accurate of any yet given.

palpi

palpi short, chelate, and porrected; the thumb or moveable fang much hooked at the point: feelers, or more properly the arms, as long as the body, and cheliferous: the hand ovate: fangs slender, slightly hooked, and smooth, but furnished with hair: legs eight, each provided with a pair of minute claws; these are also hirsute: eyes two, placed on the sides of the head, and none on the top: the colour is chesnut.

Length one eighth of an inch.

Although it appears that this curious insect has been now and then met with in this country; yet as it is esteemed rare, and is so little known, some further accounts of it from personal observation may not be unacceptable to the curious entomologist; and an outline figured in the plate will at once convey some idea of its structure, and evince that it is perfectly distinct from either the *P. cancroides* or the Lobster insect figured in Adams on the Microscope by Kanmacher, plate 18.

The first I obtained was from Cornwall, taken on the rocks contiguous to the sea; but I have since found them to be very common in my own neighbourhood.

In an old slate quarry situated in a wood, and now overgrown with trees, where the rays of the sun can enter only for a short time in its diurnal course, I was greatly surprised to find several of these insects adhering to one of the flat stones: they were not exposed on the upper surface, but lying quiescent on the other side, with their arms drawn close to the body. This discovery induced me to search for more; and by turning up many of the loose stones, it was obvious that this hitherto esteemed rare insect was colonized here in considerable abundance. It was in the beginning of April when these were first noticed, and at that time they were scarcely larger than *P. cancroides*, and tender, as well as much paler in colour than the specimen from Cornwall. In the latter

latter end of May I again visited my colony, and found them equally plentiful and increased in size, but not one so large as the Cornish *P. acaroides.* Rather later in the year, perhaps about the middle of June, I found one in a different place, but under a slate, that was not much inferior in size to my former specimen; and circumstances prevented me from visiting my colony again till October, when with the utmost search not one was to be found. From these circumstances it may be concluded, that the life of this animal is extended to only six or eight months, or at least short of a year, for not one old or full grown one was to be found: it is therefore probable that the eggs are deposited early in the autumn, or latter end of the summer, and are brought to life by the first warm weather in the spring.

Like *Phalangium bimaculatum**, the *P. acaroides* delights in dry shady places amongst stones, especially slate. But aridity as well as much heat appears to destroy both these insects: even confinement in a bottle or box is usually fatal in a few hours. Thus the temperature of a slate exposed to the solar rays would instantly destroy them, from the great absorption of heat by so dark a body, although an ant finds no inconvenience from such accumulated heat.

I cannot conclude this subject without observing, that although it has been thought proper in this place to affix to the insect in question the titles by which it is generally known, yet it must be remarked that, according to the Linnean character of the genus *Phalangium*, the *acaroides* can have no claim to a place in that family: and certainly those who, like Fabricius, have considered it as a *Scorpio*, have not mended the matter, for in fact it wants all the essential characters of that genus: the eyes on the back,

* Donovan British Ins. vol. v, tab. 156. 4. This is common in similar situations with *P. acaroides*.

the pectoral combs, and the articulated tail armed with a spine. De Geer has very properly instituted a new genus for it under the title of *Chelifer*, to which the *cancroides* and the other species figured by Kanmacher should be referred*.

It will be observed that the *P. acaroides* differs from the last-mentioned species in being destitute of the cleft on the inside of the thick part of the claw, or rather the hand, which is so conspicuous in the species figured by Kanmacher, and which species at present seems to be the only one noticed in this country, although that author remarks that he received four from Holland very perfect.

The absurd idea, that either this or the *P. cancroides* gets into persons' legs and creates humours, is certainly without foundation, neither of them being furnished with a proboscis like the *Acarus;* and it is more than probable the habits of *Acarus autumnalis* have been ascribed to these insects. That little creature, almost invisible to the naked eye, abounds in dry summers so much as to be extremely distressing to those who enjoy rural sports; and where the habit is readily excited to inflammation, dreadfully inflamed legs will frequently be the consequence, of which I have known several instances. I have found this species of *Acarus* particularly attached to raspberry bushes, and in this situation it usually attacks the arms as well as the legs of those who are in the habit of picking the fruit.

The *P. cancroides* is more commonly found amongst collections

* Dr. Shaw thinks, from the remarkably truncated form of the abdomen of this insect, that it constitutes a distinct species from the *P. acaroides,* and might not improperly be named *P. truncatum.* The insects of this tribe may be allowed to form a separate genus, nearly allied to that of *Scorpio,* under the title of *Chelifer,* the name applied to them by De Geer. The *P. cancroides* is certainly furnished with a pair of pectinated organs resembling those of Scorpions, though in a somewhat different situation, being placed nearer to the head.

of

of natural subjects than elsewhere; it is not uncommon to see four or five together in one case of my preserved birds, and yet I have never observed it in any other part of my house. The progressive motion of this insect is very slow and uniform, contracting its arms and becoming motionless when touched. On the contrary the *P. acaroides*, though not very quick in its usual movements, will, if touched, run either backwards or forwards with great celerity, and will sometimes leap like *Aranea scenica;* possibly like that insect it springs upon its prey.

NYCTERIBIA.

Without eyes, antennæ, or anterior mouth, but upon the top of the thorax a cylindric proboscis or sucker: legs six, each armed with two hooked claws.

NYCTERIBIA VESPERTILIONIS.

TAB. III. Fig. 5.

Nycteribia Vespertilionis. *Latreille, Gen. Crust. et Insect. tom.* iv. *p.* 364. *tab.* 15. *fig.* 11.

Celeripes Vespertilionis. *Trans. Linn. Soc. vol.* ix. *p.* 166. *note.*

This extraordinary animal, hitherto only observed to inhabit two species of bats, *Vespertilio Ferrum-equinum* and *minutus,* is properly divided into two parts, the thorax and abdomen, being destitute of head, as well as of eyes, and the other appendages usually attached to that part. It has only three pairs of long legs, which are affixed to the thorax, and are placed in a very unusual manner, originating from the upper part, leaving the visible part of the thorax very narrow above, but consequently much broader beneath, and when viewed in this last position it obscures the first joint of the legs; on this side there is a longitudinal suture.

The abdomen appears to have three divisions: the first joint or annulation is by far the largest on the upper part, but by its obliquity becomes narrow beneath: the margin or divisional line has a pectinated appearance under the microscope, similar to that observed in the common flea: the posterior joint is smallest, and is terminated with two long fleshy papillæ furnished with four bristles regularly radiating: upon the upper part of the thorax close to the anterior end is a cylindric erect appendage beset with bristles; this appears tubular, and seems to be the proboscis or trunk by which the animal takes its nourishment: should this be the case, and of which there seems no doubt, its manner of feeding must be curious, as it must turn on its back to apply this mouth to the skin of the bat. So strange and contradictory to experience is the formation of this insect, that, were it not for the structure of the legs, no one could doubt that the upper was actually the under part of the body, as well from the situation of the legs, as from that of the proboscis: the joints of the legs however demonstrate otherwise, and the living animal examined in motion puts it beyond all doubt: the legs have four joints, independent of the foot to which two remarkably hooked claws are fixed, and at their base a spongy substance: at the end of the tibia next to the tarsus are a few annulations, like imperfect joints.

Length one eighth of an inch; the legs not quite double that of the body.

In another specimen examined, the body or abdomen appeared to have four joints, was more ovate, tumid, and destitute of the posterior appendages; the thorax and all the other parts similar to the first. This I suspect to be the female; and the sexual distinction seems to be further exemplified by the posterior end of the former being bilobated vertically, and when examined

sideways

sideways it was obvious the stellate appendages issued from the lower lobe.

The very singular structure of this insect, which at first appears to be a strange deformity of nature, and excites our astonishment, will, like all other creatures constructed by the same omnipotent hand, be found to be most admirably contrived for all the purposes of its creation; and the scrutinizing naturalist will soon discover this unusual conformation to be the character which at once stamps its habits and œconomy.

The motion of this insect is so extremely quick that it surpasses every species I have hitherto noticed: it transports itself with such celerity from one part of the animal it inhabits, to the opposite and most distant, although obstructed by the extreme thickness of the fur, that it is not readily taken. When it applies the proboscis to the skin of the bat, it reclines on its back, and by this means it holds most securely by its claws to the larger hairs.

When two or three were put into a small phial, their agility appeared inconceivably great; for, as their feet are incapable of fixing upon so smooth a body, their whole exertion was employed in laying hold of each other, and in this most curious struggle they appeared to be actually flying in circles; and when the bottle was reclined, they would frequently pass from one end to the other with astonishing velocity, accompanied by the same gyrations: if by accident they escaped each other, they very soon became motionless; and as quickly were the whole put into motion again by the least touch of the bottle, or the movement of an individual. In this situation they survived two or three days.

Besides this species I found on *Vespertilio Ferrum-equinum* an *Acarus* with a pale lead-coloured ovate body, and eight extremely long and slender legs, and the valves of the proboscis very conspicuous.

On

On *V. minutus* was another species of *Acarus*, with only six legs of moderate length, and a reddish ovate body. Whether these are new, and each peculiar to the respective bats from which they were taken, is not at present to be determined, and the remark is only intended for the future observation of others.

MONOCULUS.

MONOCULUS ROSTRATUS.

TAB. II. Fig. 5.

Body ovate, crustaceous, of a pale yellow colour, with a darker longitudinal line along each side: antennæ four, the superior pair bifid near the base, one branch moderately long, the other very short; the lower pair simple, and nearly as long as the body, the three first joints large; all these are hirsute, and incline downwards: eyes two, large, pedunculate, and reticulated, appearing in a strong light crimson; these are covered by a pointed beak or shield a little incurvated, convex above, and concave beneath: natatorial legs three pairs, these are slightly bifid and very hirsute; between these and the front are several fasciculi of bristles: tail longer than the body, consisting of five joints elevated at their junction, the middle one furnished with two small appendages beneath: to the end of the tail are attached two subulate caudal fins terminated by a long setaceous appendage, and covered with hair.

Length to the end of the tail three eighths of an inch.

When in motion, the fasciculi beneath, which appear to be abdominal fins, as well as the superior antennæ were observed to be in continual motion; the inferior antennæ were usually motionless, and brought under the body.

This marine *Monoculus* is I believe the largest species this county

county produces, and, as far as I have the means of ascertaining, has not been described; at least nothing sufficiently corresponding in character appears in Gmelin.

ONISCUS.

Oniscus cæruleatus*.

Tab. IV. Fig. 2.

Body subcylindric, of a resplendent blue, and destitute of joints: the head is conic and pointed: the thorax, which appears to consist of two ventricose joints, is of a pale colour like that of the head: antennæ four, setaceous, the interior pair longest, with three visible joints each: eyes two, large, black and reticulated: legs ten, two pairs of which are affixed to the thorax, and the others to the abdomen: the tail is flat, with five strongly defined articulations, and furnished with five caudal fins, the middle one largest and conic, the lateral ones ovate, and furnished with long bristles; this part is nearly the colour of the head and thorax, pale brown. The under part of the body is equally convex and of the same colour as above, appearing under the microscope to be destitute of any division: this crustaceous covering is subpellucid, and in some lights is a little shaded by the intestines.

It swims with the head foremost, although its tail appears to be the chief instrument of progressive motion; for this purpose the tail, like that of a fish, is always extended, and the effect is produced by a vibratory action.

* Dr. Shaw is of opinion that this insect might be permitted to constitute a distinct genus. At all events it appears sufficiently remote from that of *Oniscus*, and seems more nearly allied to some of the smaller divisions of the genus *Cancer*, though not properly belonging to any of them.

Length

Length one eighth of an inch. Rare.

Two of these insects were discovered adhering to the body of a Father-lasher, *Cottus scorpius.*

A species in every respect like this except in colour has once occurred, but whether distinct or only a sexual difference is not to be determined. In this the body was white; the head, thorax, and tail maculated with yellow.

DORIS.

Doris papillosa.

Tab. IV. Fig. 3.

Doris papillosa. *Gmel. Syst. p.* 3104.—*Turt.* iv. *p.* 78.—*Baster* i. *p.* 81. *t.* 10. *f.* 1.

Body ovate-oblong, rounded in front, acuminated behind: on the fore part are two long slender tentacula somewhat compressed and pointed; these turn outwards, and being retractile, and similar in colour to the papillæ that are contiguous, are not easily discernible except when the animal is in motion: above these are two other annulated approximating tentacula which are erect, and capable of retracting within proper receptacles; these are dusky with white tips: a bare space in front extends in an angle behind the posterior tentacula: along the middle of the back smooth; the rest of the body above, covered with long papillous appendages, that are capable of changing their form from round to flattish, and are somewhat retractile; the ground colour of these is yellowish white; but when in their more usual order sloping backwards, some specimens appear brown by reason of being closely speckled with that colour: the bare space along the back is capable of contraction, and in that state

is

is not readily discovered, but when dilated is very conspicuous, and a regular pulsation is discernible.

Length two or three inches. Not uncommon.

From the points of the papillæ an extremely viscid secretion is discharged, that sometimes envelops the whole animal.

Of the British species this comes next to *Doris argo* in size, and is not less known on the south coast of Devon.

Doris quadricornis.

Tab. IV. Fig. 4.

Body ovate, mottled brown and white; along each side an obsolete row of tubercles, somewhat dilatable, extending from the tentacula to the vent: tentacula four, long, both pairs originating from the upper part, and approximating; the anterior shortest setiform, inclining forwards; the others filiform, reflecting backwards, the same colour as the body: vent situated near the extremity of the back, surrounded with eight or nine branched appendages.

Length three eighths of an inch. Rare.

Doris pennigera.

Tab. IV. Fig. 5.

Body oblong, acuminated almost to a point at the posterior extremity, covered with small spots of bright orange and black on all the upper parts; the black markings are smallest, and appear radiated under a lens: the anterior end is sub-bifid, extending each side into an angular lobe: tentacula two, sub-clavated and perfoliated; these originate on the upper part some distance from the anterior end, and each is nearly surrounded by a sort of bipartite wing: the vent is on the back, furnished

 with

with five branched appendages that partly surround it on the fore part, and two large bifid peduncles behind.

Length half an inch.

One specimen only of this singular and gaudy animal has occurred; it was taken at low water on the rocks at Milton.

APHRODITA.

Aphrodita viridis.

Tab. IV. Fig. 1.

Aphrodita cirrhosa. *Gmel. Syst. p.* 3109?

Body long, greenish, with about thirty-six fasciculi on each side, and covered with eighteen pairs of squamæ, which appear a little speckled by reason of their being somewhat rugose: the fascicles are much divaricated, and between each scale is a fleshy filiform appendage terminated by an extremely fine fibre: tentacula four, setaceous: eyes four, small and black.

Length three fourths of an inch. Rare.

Possibly this is the *cirrosa* of Pallas, as it nearly accords in the number of feet; and probably some of the scales of his were lost, as it is usual for them to be in number about half those of the feet.

Many species of squamous Aphrodites are with difficulty conveyed, even in sea water, to a small distance, without being mutilated, especially with respect to the scales, which are extremely deciduous: this circumstance is the occasion of great difficulty in ascertaining the species already described.

AMPHI-

AMPHITRITE.

Amphitrite vesiculosa.

Tab. V. Fig. 1.

Body with numerous annulations of a pale dull orange colour minutely speckled with yellowish white; a broad indistinct stripe down the back, in the middle of which is a depressed line as far as the ninth joint, where it turns transversely to the left side and is lost; the eight anterior joints are destitute of the dorsal depression, and on this part the branchia and fasciculi are most conspicuous: tentacula two, furnished with about twenty-eight long ciliated fibres each, similar in shape to those of *A. ventilabrum*, but of an olive-green mottled with gray, and partly disposed in bands, when the plumes are extended: these do not form a regular circle when expanded, like *A. ventilabrum*, but appear sub-convoluted, the under part turning inwards; at the point of each ray is a dark purplish vesicle, most conspicuous on the anterior ray of each plume, terminated by a short hyaline appendage: the mouth ringent: lips whitish, furnished with two slender feelers or cirri: behind the plumose tentacula is a scalloped membrane surrounding the anterior end; this, except the lower division, is white.

Length six or seven inches; diameter of the largest part above one fourth of an inch.

This new and beautiful species, like most others of the genus, prepares a tube for its habitation, the internal texture of which is coriaceous like that of *A. ventilabrum*, generally described as *Sabella penicellus*, but the external part is invariably coated with much coarser sand, intermixed with fragments of shells. Length of the tube ten or twelve inches.

 The

The locality of many of the productions of nature is frequently the cause of their remaining so long in obscurity, and not their actual scarcity. This remark is exemplified in the present instance; for in one particular spot in the estuary of Kingsbridge, contiguous to where the *A. ventilabrum* is found in such abundance, as mentioned in a former paper, these are nearly equally plentiful, and, what is remarkable, each keeps its station, the line of demarcation appearing to be the separation of the coarser from the finer sand, and neither intrudes upon the other: this species is the highest, and consequently more frequently uncovered by the water at low tides; the other lies in a small channel that is rarely dry.

These animals have been kept alive more than a month in sea water.

NEREIS.

NEREIS SANGUINEA.

TAB. III. Fig. 1.

Body long, slightly depressed beneath, and acuminated towards each end, but much more so at the posterior extremity; the number of joints exceeds two hundred and seventy, about forty of which at the posterior end are of a much paler colour, and appear to be a reproduction; the rest of the body is of a fine bronze resplendent with changeable prismatic tints; the sides furnished with tridentate peduncles, from the middle of which issue a flat fasciculus of hair of a pale colour, and one large black bristle: about the twenty-eighth joint commence on each side branched cirri of a blood-red colour, which afterwards increase considerably in length; these originate from the upper part of each peduncle, and are usually hexafid, but unite above the base; they are not retractile, but are generally carried erect and

and spread, giving the animal a beautiful appearance: the upper lip is bilobate, behind which are five short tentacula, the middle one standing in the suture of the lip: between the two outer tentacula on each side is a small black eye: the first joint behind the head is broader than the rest, and destitute of peduncles: the posterior extremity is furnished with two small terminal cirri: the mouth is large and placed beneath, concealing most formidable jaws, or complicated fangs, which were protruded occasionally as the animal became sickly, and very frequently in the agonies of death when a few drops of spirits were added to the sea water: this apparatus consists of three pairs of hooked fangs of a dark colour, one pair smooth, the others toothed, besides a pair of broad plates on the lower part of the mouth, the structure of which will be better understood by the accompanying figure. Tab. III. Fig. 3.

This is the largest species of Nereis yet discovered to inhabit the British shores, extending sometimes to fourteen or fifteen inches in length, and large in proportion. It inhabits rocky situations, and is found lurking under the broken fragments; but is rare.

While the animal was in a glass of sea water, the circulation of the colouring secretion through the ramifications of the cirri was a curious object, and appeared to be effected at the will of the animal; but when it became sickly, the circulation was slower, rising up through the branches of the cirri gradually as in capillary tubes, and as soon as it expired all the colour from those parts vanished.

Nereis maculosa.

Tab. III. Fig. 4.

Body linear, with about thirty pairs of fasciculate peduncles complicated with a slender pencil of hairs above the broad fascicles,

fascicles, and in some points of view appearing like a single hair; above this issues a cirrus changeable in shape, but never longer than the peduncle, independent of the fasciculus: tentacula seven, the middle one largest, and placed in the centre of the forehead between the eyes, somewhat erect, and appears to be jointed: eyes four, black, the hindmost pair smallest, and not visible on the upper part; the others are large, and most conspicuous beneath: along the back are seven cordiform, equidistant yellow spots, the ground colour white.

Length about an inch. Rare.

This is somewhat like *Nereis corniculata* of Muller, but the want of the bifid tentacula makes it distinct.

HOLOTHURIA.

Holothuria digitata.

Tab. IV. Fig. 6.

Holothuria inhærens. *Mull. Zool. Dan.* i. *t.* 31. *f.* 1—4? *Gmel. Syst. p.* 3141?

Body long, cylindric, covered with minute papillæ of a yellowish white colour, marked with small spots of red-orange closely disposed, and in many parts confluent; posterior end tinged with green: tentacula twelve, short, dividing at their tips into four obtuse branches of a pale colour.

Length when extended between three and four inches.

This rare species is capable of great contraction, and probably multiplies by natural divisions, as it separates without violence into an indefinite number of pieces: this is effected by muscular stricture, which forms ligatures and separates portions into globular pieces; sometimes two or three of these ligatures are formed together, and as many separations ensue, provided the exterior

exterior one first falls off, otherwise the part separated appears to continue in that moniliform state. This, however, may be a forced action from confinement in a glass of sea water, and one division at the extremity is the order nature most likely pursues. It must however be admitted that our knowledge with respect to these inhabitants of the deep is extremely limited, since they can only be examined when taken from their natural abode: the form of these creatures is nearly all we may expect to become acquainted with, for their œconomy is concealed from us by that insurmountable barrier which no philosopher can pass.

The faculty this animal possesses of separating into so many parts renders it quite impossible to preserve a perfect specimen.

It must be confessed that Muller is referred to with doubt, as I could not discover any regular series of papillæ in the present subject, which that author describes in his; nor was there any appearance of pinnæ on the sides of the tentacula, as represented by Muller; and yet, if the figure of this is compared with those of that author given of the natural size, a difference is scarcely obvious. With similar doubt Gmelin is quoted, who refers to Forskahl as well as to Muller; and if we may judge from the figure given of *Holothuria inhærens* in the *Naturalist's Miscellany*, vol. viii. tab. 260, (the author of which quotes Gmelin, and like him refers to the *Fistularia reciprocans* of Forskahl,) the *H. digitata* is perfectly distinct. Probably the former author did not consider the species given by Muller to be the same as referred to in Forskahl, as he has not quoted *Zoologia Danica*: indeed there can be no doubt but the *H. inhærens* of *Nat. Misc.* and *Zool. Dan.* are perfectly distinct.

THALASSINA.

THALASSINA.

Body short, mutable: an aperture at each extremity: the mouth furnished with a greatly extended lip serving the double purpose of collecting nourishment, and of progressive motion.

THALASSINA MUTATORIA.

TAB. V. Fig. 2.

Lumbricus thalassema. *Gmel. Syst. p.* 3084.—*Turt.* iv. *p.* 59.—*Pall. Spicil. Zool.* x. *p.* 8. *t.* 1 *f.* 6.

This animal is ovate-oblong in a quiescent state, and rather more than half an inch in length, but sometimes extends to more than an inch, and then changes its form by alternately inflating each end: it is furnished with annulations which become ridged at the posterior end, where it terminates in a point or nipple: it has also longitudinal striæ that decussate the annulations irregularly, giving a squamous appearance: at the anterior end the margin of the aperture extends into a very long amorphous appendage, frequently three or four times the length of the body, at other times contracted very short, but never receding within the mouth: in the former state it is usually flat; in the latter the sides fold together and almost form a tube, becoming much scalloped or wrinkled on the margin; and at the base the sides unite, forming a sort of funnel to the mouth: by this implement not only nourishment is collected, but its only progressive motion is performed: it is in continual action, thrown about in all directions in search of food, and occasionally by fastening it to a distant body the animal is drawn forward, or turned to either side: at the anterior end immediately behind the long appendage are two very minute feelers which are not always protruded.

The posterior half of the body is of a blueish-gray, the other purplish-pink; the appendage saffron, paler at the extremity.

This

This curious animal was kept alive in sea water several days, for examination, and was never observed to take in or eject that element like the Holothuria tribe, but at the posterior end is an evident opening for discharge of the fæces.

It can scarcely admit of a doubt but that this is the animal figured by Pallas, though so badly represented. By this author we learn that it was originally found on the coast of Cornwall amongst the submarine rocks, and communicated to him by Gærtner under the title of *Thalassema Neptuni*, intending, it is presumed, *Thalassina* as expressive of its nature.

The present subject was taken in a similar situation on the coast of Devon; and as it evidently is not belonging to the genus *Lumbricus*, nor to any other established genus in Helminthology, it has been thought right to give it a distinct place in the system of Nature, and I think it might with propriety immediately precede Holothuria.

PLANARIA VITTATA*.

TAB. V. Fig. 3.

Body ovate, yellow, the margin edged with white, and marked with concentric, broken lines of black; in the middle a broad white longitudinal line, with a central black one: in the front are two auricular appendages, each marked with a black patch on the hinder part: at a small distance behind the auricles, at the commencement of the dorsal white line, are two contiguous patches consisting of numerous minute black spots, appearing perfectly distinct under a lens, and which are probably eyes.

The white part in the middle is somewhat convex, and seems to be what contains the viscera; the rest is extremely thin.

Length when extended an inch and a half; breadth one inch.

This extremely beautiful marine Planaria has a slow and gliding motion, the margins undulating into raised scallops.

* This seems allied to the *Doris quadrilineata* Linn. Gmel. p. 3104. 6. G. SHAW.

Two were taken by accident amongst *Spongia tubulosa* at the Salt-stone in the estuary of Kingsbridge, in the month of August, and fortunately a drawing was taken the same day, for on the next morning not a vestige remained of them, although placed in a glass of sea water; they were completely decomposed and turned into a milky fluid.

REFERENCES TO THE FIGURES.

Tab. I. *Fig.* 1. Cancer septemdentatus.
2. ——— biaculeatus.

Tab. II. *Fig.* 1. ——— spinosus.
2. ——— Galba.
3. ——— monoculoides.
4. Phalangium acaroides.
5. Monoculus rostratus.
6. Cancer pedatus.
7. ——— obtusatus.

Tab. III. *Fig.* 1. Nereis sanguinea.
2. ————————— peduncles magnified.
3. ————————— fangs magnified.
4. ——— maculosa, (a.) peduncle magnified.
5. Nycteribia Vespertilionis, magnified.
6. ————————————— under side.
7. ————————————— leg highly magnified.

Tab. IV. *Fig.* 1. Aphrodita viridis.
2. Oniscus cæruleatus.
3. Doris papillosa.
4. ——— pennigera.
5. ——— quadricornis.
6. Holothuria digitata.

Tab. V. *Fig.* 1. Amphitrite vesiculosa.
2. Thalassina mutatoria.
3. Planaria vittata.

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Warner Sculp.

Warner Sculp.

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II. *Observations on the supposed Effects of Ivy upon Trees, in a Letter to the President. By Humphrey Repton, Esq.*

Read April 17, 1810.

MY DEAR SIR,

FROM the intimacy that subsisted between us in early life, to which I often look back with peculiar delight, and from the knowledge I have of your patient spirit of inquiry in all that relates to Natural History, I venture to address to you the following remarks concerning IVY.

Although I am afraid that any attempt to remove the long established prejudices concerning it, will be deemed chimerical by those who have taken up a contrary opinion from theory, to that which I deduce from facts and observation, yet I will venture to assert, that Ivy is not only less injurious to trees than it is generally deemed, but that it is often beneficial, and its growth deserves to be encouraged rather than checked, as is too often practised in woodland countries.

I have been led to adopt this opinion during the last two or three years, from having observed the timber in some very old parks and woods, (as at Stoneleigh Abbey, Warwickshire; Langley in Nottinghamshire, and some others,) where the Ivy had not been cut off, and where the timber was in greater perfection than at other places in the same neighbourhoods where the Ivy had been most cautiously destroyed: and during the winter of 1808 and 1809, the contrast betwixt the scenery of different

places

places with and without Ivy was so striking, that I was insensibly led to collect facts in support of the opinion so diametrically opposite to the theory of those who consider Ivy as a destroyer. In Miller's *Dictionary* by Martyn, we read, "Hedera (ab edendo, quod arbores exedit, because it wastes and devours trees);" and in Evelyn's *Silva*, book ii. chap. vii. it is classed among the things injurious to trees, without any reason assigned, and is thus mentioned: "Ivy is destroyed by digging up its roots and loosening its hold; but even the removal of Ivy itself, if very old, and when it has long invested its support, is attended with pernicious consequences, the tree frequently dying from the sudden exposure to unaccustomed cold." And I have found in the north of England that Ivy is considered as a "clothing to keep the tree warm." Yet the poets of all ages have accused the Ivy of feeding on the tree by which it is supported: although it is now very generally known that it draws its nourishment from the soil by roots, and not from those fibres which have been mistaken for roots, but which are in fact claspers by which it fastens its tendrils to the bark of trees, when the bark is of sufficient thickness: but it is a remarkable fact, that Ivy will not lay hold of the shoots of any tree till the bark is three or more years old; and that it is more apt to attach itself to trees whose bark is decayed, than to young and healthy shoots where the bark is thin and smooth.

It very rarely happens that Ivy climbs to the extremity of a young shoot; and if it were capable of doing so, and of subduing the growth of young branches, it would more easily destroy the shoots of pollards cut down close into very large masses of Ivy, as we often see by the side of high roads; whereas, on the contrary, it will be found, that if there be any difference in the growth of such shoots, it will be in favour of those pollards that are most profusely covered with Ivy.

Another

Another mistaken idea prevails among woodmen respecting *Ivy-bound trees*, as if the tree were *bound* round by Ivy, as is often the case by honeysuckles, traveller's joy, and other creepers, which form a spiral round the stem, and may perhaps check the circulation of juices in the tree. But this is not the case with Ivy; it goes up straight on one side, or trails along the surface of lateral branches, without attempting to girt round or form a spiral line, or tight bandage: on the contrary, it may be remarked that Ivy appears to *feel its way* with a sort of finger-like extremity, by which it insinuates itself into cavities in bark, or crevices in the wall, but does not affix its holders till it meets with a substance which cannot be injured by them. Indeed, of so singular a nature is the mode of growth and attachment in Ivy, that it seems possessed of some *sensitive quality*; for the first effort to fasten itself is by a kind of gluten, or by a spongy substance like that by which flies walk up the smooth surface of glass windows. This is particularly evident in the five-leaved Ivy; but the common Ivy does not attach itself to smooth or vigorous young bark of the trees that support it, nor will it fasten to its own shoots, but seems cautiously to avoid them, generally by taking a different direction, and sometimes by crossing over the fibres, leaving a space between, for each to swell; while, on the contrary, it feels its way and insinuates itself most closely into all cavities, particularly in old walls, which may sometimes be injured, but I believe are more often supported, by the matted and reticulated fibres which hold the loose stones together.

Linnæus affirms that "*it does no injury to buildings*," as quoted in Martyn's *Miller's Dictionary*, from Curtis, who afterwards gives his *Reasons* for thinking Linnæus mistaken. These are very similar to those given me by the most venerable patron of Natural History, to whom I bow with due reverence; but I cannot admit

mit any man's theory to supersede facts; and the observation of the great Linnæus respecting Ivy on buildings confirms mine respecting Ivy on trees; that although it may in a few cases be injurious, it is oftener beneficial; and therefore I hope it will not be deemed presumptuous in me to say, after Linnæus, and in his words, that "*it does no injury to*" Trees.

It is a fact, that of trees covered with Ivy, there are *apparently* more sickly than sound ones. But there are many reasons to be assigned for this appearance: 1st, The Ivy in winter renders the trees more conspicuous, and few people who see dead branches proceeding from such trees examine whether there may not be other trees near them equally decayed. 2dly, Because a decaying or even a dead tree often serves to support Ivy, it is too often hastily supposed that Ivy is the cause of its death or decay. And 3dly, It is the property of Ivy to attach itself to decaying trees in preference to the more healthy ones; and as such trees are of less value, they are often left after their neighbours have been cut down and sold. This will alone account for the comparative difference in the number of sound and unsound trees supporting Ivy. But if a single instance be produced of a healthy tree covered with Ivy near another tree not so healthy without Ivy, this alone would lead us to pause before we cut the Ivy from the tree, "lest," as Evelyn asserts, "the tree may be killed by the sudden exposure to unaccustomed cold."

Instead of a single instance, I could transcribe from my minutes examples of every kind of tree compared with others of the same kind near it; and could confirm my facts by sketches taken in various parts of the kingdom: but I shall only subjoin a few specimens of such facts as have induced me to take up an opinion on the subject.

FACTS.

FACTS.

No. 1.—At Twickenham Park, now Mr. Gosling's, the banker, are two rows of very large cedars; two trees are most profusely covered with Ivy, and a very intelligent nurseryman (Mr. Burchel) proposed cutting its roots to preserve the trees, till I convinced him that these two were the largest trees, and that the Ivy seemed coëval with the cedars themselves, which they had certainly not in the least injured.

No. 2.—At Blickling, in Norfolk, the green-house stands between two very large fir trees; the biggest is covered with Ivy, the other is a bare pole and not so large, though evidently of the same date, and both equally healthy. But the old gardener could not be convinced, and only replied by an answer often made, *viz.* that the tree might perhaps have been still larger if it had not been loaded with Ivy.

No. 3.—The trees on Lord Hardwicke's estate at Wimpole furnish very striking effects of Ivy: in the pleasure ground east of the house, the Ivy trees in the grove are most decidedly the tallest, largest, and most healthy.

No. 4.—A large ash very near the road in Arrington is a curious example of prejudice: it is a forked tree, one half naked, the other has been loaded with Ivy: the naked side shows strong symptoms of decay, the other is quite healthy: but under an idea (I suppose) of saving the tree, the Ivy has been recently cut off, and was hanging in vast masses, with stems of great bulk loosened from the tree without leaving any indenture in the bark of the tree:—but the Ivy is the offender!

No. 5.—At Stoneleigh Abbey in Warwickshire, the timber is generally of prodigious size, some oaks measuring twenty feet round at five feet from the ground, many are richly covered with

Ivy;

Ivy; but I could not perceive any difference between those and the more naked trees, except that they appeared more luxuriant in the extremity of their branches; and I observed many coupled trees and forked trees under similar circumstances.

No. 6.—At Langold in Yorkshire, (a seat of Gally Knight, esq.) the trees are not generally so large as those at Stoneleigh; but the two places agree, in the Ivy not having been so much destroyed as is generally the case; and, both in examining the trees near each other and those growing from the same root, I was confirmed in my opinion.

No. 7.—In a lane betwixt Hertford and Hatfield there are many very large old thorns in the paling of Hatfield park, so covered with Ivy, that in the winter of 1808 I thought it an evergreen hedge, and the sprays of the thorns were hardly visible; yet when compared with a few thorns in the same lane, they appeared to be equally vigorous. In the last summer I was surprised to miss the Ivy, till I perceived that the foliage of the thorns had so entirely covered it, that the Ivy was only a secondary object in Nature's great plan of decoration, and seemed humbly to retire into the shade of more luxuriant ornament, to come forward again, as I have lately seen it this last winter, when the neighbouring bushes were reduced to mere sticks:

"Vernantesque comas tristis ademit Hyems."

No. 8.—At Woburn Abbey the timber has so generally been denuded of Ivy, that I despaired of finding any example, except in the elm near the Duke's apartment, and which is very conspicuous (in winter) from its profuse mantle of Ivy. But this was deemed inconclusive, although much superior in growth to some other trees near the same spot, because it was supposed that they might have contributed to its growth by sheltering it from the south-west winds. I afterwards discovered in the park a re-

markable

markable specimen, which is the outermost tree of a grove, and the most exposed to the south-west. The tree nearest to it has some dead branches, and seems evidently to have yielded to its neighbour's superior vigour. As this is an example obvious to all the agriculturists who attend the Woburn sheep-shearing, I have, with the Duke of Bedford's permission, marked a drive very near this specimen, which may serve to call the attention of the curious to this subject. I should here further add the result of some experiments made by Mr. Salmon, who is well known for his mechanic ingenuity, and who has the superintendence of His Grace's woods at Woburn. He tried the comparative substance and strength of several kinds of timber with the same kinds *Ivy-bound* as he calls it; but he could not find any difference, and is of opinion "that in old trees it does no harm; and that in trees of ten or twelve years old it neither checks the growth, nor is the wood lighter or weaker; but he is still convinced that he has seen young trees killed by the Ivy." It is, therefore, in this sense of the word that Ivy may be considered as a destroyer. But experience has discovered that the destruction of turnips and other plants while young, and the thinning of green fruit from trees, is a part of the economy of nature; and in this instance its injury may be granted,—although, for the reasons already assigned, I do not see how Ivy can oppress plants to whose bark it cannot attach itself.

It remains only to mention the advantages to be expected from a less rigorous persecution of this plant: 1st, It may be stripped from the trees in winter to feed sheep and deer, to whom it is grateful and wholesome food. 2dly, Its berries are a great resource to pheasants, poultry, and every kind of bird, during very severe weather. And lastly, If it were more generally encouraged, or rather if it were less unmercifully destroyed, our winter's

 landscape

landscape would be greatly improved. I could not but observe the contrast of places visited during the same winter. Instead of that melancholy scenery in parks where no Ivy is permitted to grow, and where each rugged and venerable oak, without its foliage, presents in winter a picture of old age with poverty and nakedness; the rich mantle of Ivy thrown over the trees of Langold and Stoneleigh gave grace and dignity to age, while it concealed its decrepitude.

The mass of mankind look on the vegetable part of the creation with a view only to its producing food, or medicine, or materials for economical purposes, or *money*, which includes all the rest. But every pupil of the Linnæan school, if I may judge from his labours, and from your pursuits who are so justly at the head of that school, must have more exalted notions of the Creator; and must be well aware that the BEAUTY of His works is equal to their UTILITY, and that the PLEASURE of man is provided for as bountifully as his NECESSITIES. It is therefore, my dear sir, with peculiar satisfaction that I address these remarks to you, as the best means of insuring and exciting attention to a subject, which may eventually prove beneficial to the agriculturist and the sportsman, while it may tend to improve the beauty of our winter scenery: and I beg you will with this view communicate the whole, or any part, of what I have written, and suppress any part, or throw it out into separate notes in any way that you may judge most likely to call attention to the subject, and suspend for a while the destruction of a plant, which I cannot but consider as one of the most useful and ornamental works of the Creator. Believe me with great regard, my dear sir,

Yours most faithfully and cordially,

H. REPTON.

April 8, 1810.

III. *An*

III. *An Essay on the British Species of the Genus Melöe, with Descriptions of two exotic Species. By Wm. Elford Leach, Esq. F.L.S.*

Read June 19, 1810.

I WAS induced to examine the Genus Melöe from having in my cabinet all the British species hitherto discovered, and from observing the confusion which reigned throughout this Genus, one species having been confounded with another, or described twice under different names: to point out these errors is the intention of the following essay, which I now take the liberty of laying before the Society.

MELÖE.

Character Artificialis.

Antennæ submoniliformes, undecim-articulatæ, articulo secundo minore.

Palpi quatuor inæquales, subclavati.

Elytra apice rotundata, abdomine longè breviora, suturâ excurvatâ.

Alæ nullæ.

Pedes elongati, compressi.

Tarsi anteriores et medii quinque-articulati; posteriores quadri-articulati.

Character Naturalis.

CORPUS oblongum, glabrum, immarginatum.

CAPUT latum, subhemisphæricum, inflexum, gibbum.

Mandibulæ rectæ, sæpiùs bifidæ.

Labium corneum, emarginatum, punctulatum.

Oculi laterales, oblongi, haud prominuli.
Antennæ sæpiùs pilosæ, inter oculos sitæ.
Palpi quatuor sub-clavati, articulo primo minori:
exteriores longiores, quadriarticulati, articulo ultimo ovato:
interiores breviores, tri-articulati, articulo ultimo dilatato, truncato.

Truncus subquadratus, capite sæpiùs angustior.
Thorax punctatus.
Pectus punctulatum.
Epigastrium glabrum, punctatum.
Scutellum minutum, elytris tectum.
Pedes compressi.
Tarsi anteriores et medii 5-articulati;
posteriores 4-articulati.
Elytra coriacea apice rotundata, abdomine breviora, suturâ excurvatâ.
Alæ nullæ.

Abdomen oblongum, sæpiùs molle; segmentis octo.

LARVA adhuc latet.
VICTUS herbæ.
TEMPUS vernale, autumnale.
COLOR sæpiùs obscurus.

Familiæ *ab antennis desumptæ.*

* Antennæ filiformes, breviores.
** Antennæ filiformes, tenuiores, elongatæ.
*** Antennæ extrorsum crassiores.
**** Antennæ medio crassiores, curvatæ.

Hæ familiæ fortè Genera naturalia.

Observatio. In familia quarta Mas Fœminæ antennas antennis amplectitur. (Copulatione observavit Georgius Sowerby.)

* *Antennæ*

* *Antennæ filiformes, breviores.*

1. Melöe variegatus.

M. sub-æneus, variegatus, capite thoraceque punctatis, elytris scabrosis.

Tab. VI. Fig. 1. 2.

M. *Maialis.* *Schæff. Icon. tab.* 3. *fig.* 6.
Panz. Ent. Germ. 350. 2.
Faun. Germ. Init. 10. *t.* 13.

M. *Mayalis,* segmentis dorsalibus abdominis rubro-cupreis.
Oliv. Ins. no. 45. 6. *tab.* 1. *fig.* 4.

M. *variegatus.* *Donovan Brit. Ins. tab.* 67.
Mart. Eng. Ent. t. 39. *fig.* 1.

M. *scabrosus,* sub-auratus, capite thorace elytrisque rugosis scabris. *Marsh. Ent. Brit.* 1. 483. 5.

In M. *Maiali* thorax transversus, posticè emarginatus; abdominis segmenta cuprea, fasciâ transversâ viridi; corpore cupreo viridique vario, rugoso.
Latreille Gen. Crust. et Ins. tom. 2. *p.* 218.

Long. Corp. Maris 8 lin. ad 1½ unc.
Fœm. 1 unc. ad 1 unc. et 9 lin.

Habitat in Angliâ, Galliâ et Germaniâ, graminibus victitans.

DESCR. Caput nigro-cupreum, lateribus purpureo-violescentibus, punctis plurimis sæpè confluentibus impressum. *Labium* superius punctatum, violescens. *Antennæ* obscurè æneo-violescentes, pilosæ.

Thorax transversus nigro-cupreus, punctis sæpè confluentibus impressus, marginibus elevatis violescentibus, posticè sub-emarginatus.

Elytra nigro-ænea punctis elevatis, sæpiùs confluentibus, nitidis, interstitiis obscurioribus.

Abdomen,

ABDOMEN, *Maris*, totum sub lente scabrosum, segmentis dorsalibus anticè aurato-viridibus, posticè rubro-cupreis violescentibus; subtus aureo purpureoque variegatum.
Fœminæ, nigrum glabrum, maculâ scabrosâ, anticè aurato-viridi, posticè rufo-violescente; subtus aureo purpureo viridique variegatum.

PEDES nigri, obscurè violescentes, femoribus purpureo-violescentibus nitidis.

This insect, which is certainly the most beautiful of the genus, has been confounded by all the Continental writers who have noticed it, with *M. Maialis* of Linnæus, with which they seem, from their silence, to be unacquainted*. It was first taken in

* MELÖE MAJALIS.

M. ater, marginibus segmentorum dorsalium fulvis, antennis apice emarginatis.

TAB. VI. Fig. 3. 4.

M. *Maialis*, apterus, segmentis dorsalibus abdominis rubris. *Linn. Syst. Nat.* 2. 679. 2. *Syst. Nat. Gmel.* 2017. 2.

M. *maialis*. *Fabr. Syst. Ent.* 259. 2. *Sp. Ins.* 1. 327. 2. *Mant. Ins.* 1. 215. 2. *Ent. Syst. emend.* 1. b. 518. 2. *Syst. Eleut.* 2. 588. 3.

Long. Corp. Maris 1 unc. et $3\frac{1}{2}$ lin.
Fœm. 1 unc. et $7\frac{1}{2}$ lin.

Habitat in Europâ Australi, Lusitaniâ.

Mus. Britannico; Dom. Bracy Clark, Kirby, Leach, Smith, Marsham, Milne, MacLeay.

DESCR. Totum animal atrum, nisi margines segmentorum dorsalium. *Caput* glabrum lineâ longitudinali impressum, sub lente punctis minutis impressis adspersum. *Antennæ* subpilosæ, apice bifurcatæ. *Thorax* transversus, punctis minutis impressis adspersus, sæpiùs lineâ longitudinali obsoletè impressâ, posticè marginatus emarginatusque. *Elytra* coriacea glabra, oculo armato sub-rugosa. *Abdomen* glabrum, marginibus segmentorum dorsalium fulvis, vel rubro-flavis. Pars singuli segmenti dorsalis sub lente minimè rugosa.

Obs. Insecto vivente, abdominis latera fulvescunt. *Dom. Sieber.*

This is undoubtedly *M. Maialis* of Linnæus, as there are specimens in his cabinet now in the possession of Dr. Smith; added to which, it agrees with his description, whilst *M. variegatus* does not. Fabricius and after him Gmelin erroneously refer to *Schæffer's* figure of *M. variegatus*; but as they use the words of Linnæus in their specific character, it must be considered as their *M. Maialis* also.

England

England by Mr. Crowe of Feversham, near that place, and since by Mr. Milne, near Margate in great plenty. Mr. Marsham in his *Entom. Britan.* has described it under the name of *M. scabrosus*, although it had before been described and figured by Mr. Donovan in his *British Insects* under another name, *M. variegatus*, which having the priority I have retained.

2. Melöe cicatricosus.

M. niger obscurus, capite thoraceque punctatis, elytris scabrosis.

Tab. VI. Fig. 5. 6.

M. *cicatricosus*, niger antennis brevibus, elytris parum cærulescentibus; lineis cicatricosis decussatis, interstitiis glabris nitidis. *Milne MSS.*

Long. Corp. Maris 1 unc.

Fœm. 1 unc. et 7 lin.

Habitat in Angliâ, mense Maio rarissimus. Captus a Dom. Milne prope Margate in Cantiâ.

Mus. Dom. MacLeay, Milne, Neale, Sowerby.

DESCR. Caput nigrum, punctis impressis nonnunquam confluentibus adspersum. *Labium* superius atrum, glabrum, nitidum, punctulatum. *Antennæ* atro-nigræ, pilosæ.

Thorax transversus niger, anticè latior, punctis confluentibus lineâque longitudinali impressus, posticè marginatus emarginatusque.

Elytra cærulescenti-nigra, punctis elevatis nonnunquam confluentibus, glabris, nitidis, interstitiis rugosis atris.

Abdomen supra nigro-atrum, maculâ rugosâ in singulo segmento; infra atrum, glabrum, nitidum, margine singuli segmenti posticè punctulato.

Pedes atri concolores.

Obs. Elytra fœminæ posticè emarginata.

Mr. Milne,

Mr. Milne, of Surrey Place, first discovered this insect near Margate, in Kent, and to his liberality the abovementioned collections are indebted for their specimens. It is found in company with *M. variegatus*, from which insect it is however entirely distinct.

** *Antennæ filiformes, tenuiores, elongatæ.*

3. Melöe autumnalis.

M. niger, capite thoraceque punctatis, elytris punctis erosis confluentibus.

Tab. VI. Fig. 7. 8.

M. *autumnalis*, niger lævis, elytris punctis excavatis raris.

Oliv. Ins. no. 45. *sp.* 4. *tab.* 1. *fig.* 2. a-b.

M. *rugosus*, corpore atro, elytris rugosis.

Marsh. Ent. Brit. 483. 4.

Long. Corp. 5 ad 9 lin.

Habitat in Europâ, in Angliâ prope Margate in Cantiâ, vulgatissimus, Syngenesiis victitans.

Mus. Dom. Francillon, Hatchet, Hooker, Kirby, Latham, MacLeay, Leach, Marsham, Milne, Montagu, Sowerby.

DESCR. Caput subrugosum, nigrum, lineâ longitudinali impressum, sub lente punctis numerosis impressis sæpe confluentibus notatum. *Antennæ* capite quadruplo longiores, nigræ, subpilosæ.

Thorax transversus niger, punctis confluentibus lineâque impressus, posticè marginatus emarginatusque.

Elytra nigra punctis inæqualibus erosis confluentibus, interstitiis glabris nitidis.

Abdomen atrum, glabrum, nitidum, subtus punctulatum.

Pedes atri, glabri, nitidi.

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This insect was first taken in England by the celebrated ornithologist Dr. Latham, from whose cabinet Mr. Marsham, conceiving it to be a new species, described it under the name of *M. rugosus.* It had however been figured and described in the invaluable work of Monsieur Olivier some years before: but probably that book had not reached England when Mr. Marsham wrote his *Entomologia Britannica;* which will account for his not quoting it.

It has been taken in great plenty, near Margate in Kent, by that assiduous entomologist Mr. George Milne, who favoured me with several remarks on its economy, which I shall transcribe from his letter: "Having last year brought from Margate several of that species of MELÖE which you suppose to be *M. autumnalis* of Olivier, I put a pair by themselves into a box, furnishing them frequently with fresh food. They copulated; and when the time came for depositing her eggs, the female not only passed through some earth which had adhered pretty firmly to the bottom of the box and to the roots of the plants on which she fed, but also tore up the paper which lined the box. From this it may be inferred that they deposit their eggs at a considerable depth in the earth; and there of course, when the larva breaks the egg, it can find no other food than the roots of grass."

*** *Antennæ extrorsum crassiores.*

4. MELÖE BREVICOLLIS.

M. niger, thorace transverso brevi, elytris subrugosis.

TAB. VI. Fig. 9.

M. *brevicollis,* atra thorace transverso elytrisque subpunctatis.

Panz. Ent. Germ. 1. *p.* 351. *n.* 6.

Faun. Germ. Init. 10. *tab.* 15.

 M. *brevi-*

M. *brevicollis,* nigro-violacea antennis extrorsum crassioribus, thorace brevissimo. *Paykul. Fn. Suec.* 3. 362. 2.

M. *brevicollis,* nigra, thorace transverso, posticè retuso, elytris subrugosis. *Fabr. Syst. Eleut.* 2. 588. 7.

Long. Corp. Fœm. $8\frac{1}{2}$ lin.
Maris, 7 lin.

Habitat in Angliâ; Mus. nost. In Germaniâ, Panzer et Fabr. Mus. Dom. Clark. In Hungariâ; Mus. Dom. Francillon. In Sueciâ, Paykul; Mus. Dom. Kirby.

DESCR. CAPUT glabrum, nitidum, punctis impressis lineâque notatum. *Antennæ* subclavatæ, pilosæ, atræ.

THORAX brevis, niger, transversus, nitidus, punctis lineâque longitudinali impressus, posticè valdè emarginatus.

ELYTRA subrugosa, nitida, apice rotundata.

ABDOMEN atrum, glabrum, maculâ subrugosâ nitidâ in singulo segmento, subtus nitidum, punctulatum.

PEDES atri, nitidi.

Obs. Var. β Mas, capite thorace elytris tibiis femoribusque violescentibus.

This species appears to be a pretty general inhabitant of the Continent, if we may judge from the different authors who have noticed it. Mr. Kirby has received it from Major Gyllenhall, and Mr. Francillon from Hungary. Two specimens only, however, have hitherto been taken in England; one in a sandy meadow, about six miles below Tavistock, on the banks of the river Tavy, in Devonshire, four years ago, by myself; the other, last Spring, near Shaugh Bridge in the same county, in a similar situation.

**** *An-*

**** *Antennæ medio crassiores, curvatæ.*

5. MELÖE GLABRATUS.

M. capite thorace elytrisque glabris, subpunctatis.

TAB. VII. Fig. 1. 2.

M. *punctatus*; violaceus, thorace posticè emarginato, elytris punctatis corporis ferè longitudine.

Marsh. Ent. Brit. 483. 6.

Long Corp. Fœm. 5 ad 7½ lin.
Habitat in Angliâ, rarissimus.
Mus. Dom. Kirby, Leach, Marsham.

DESCR. CAPUT glabrum, nitidum, sub lente minimè punctatum. *Antennæ* sæpiùs nigricantes, apice obscurè piceæ.

THORAX nitidus, glaber, punctis impressis lineâque notatus, posticè marginatus emarginatusque, (sæpiùs puncto utrinque excavato.)

ELYTRA subglabra, punctis erosis sparsis.

ABDOMEN supra glaberrimum, subtus glabrum, punctulatissimum.

PEDES nitidi, colore incerto.

Var. α Capite thorace elytrisque sub-purpureo-violescentibus; thorace utrinque puncto excavato, marginibus punctatis; antennis vix violescentibus.

Long. Corp. 5 lin. Mus. Dom. Kirby.

β Capite antennisque nigro-violescentibus; thorace nigro-violescente, utrinque puncto excavato; elytris piceo-atris, lateribus violescentibus; pedibus violaceis.

Long. Corp. 7½ lin. Mus. Dom. Marsham.

 γ Capite

γ Capite æneo; thorace punctis duobus confluentibus, æneo; elytris violescentibus; abdomine supra æneo, subtus nigro-æneo; antennis æneo-nigris, nitidis.

δ Capite thoraceque glaberrimis, æneo-nitidis; thorace puncto utrinque excavato; elytris æneo-nigris; abdomine supra nigro, subtus æneo-violescente; pedibus nigris, obscurè violescentibus.

Long. Corp. $6\frac{1}{2}$ lin. Mus. nostr.

The Rev. William Kirby first found this insect in England about the latter end of September, and from his museum Mr. Marsham described it under the name of *M. punctatus;* but that name (though very appropriate) having been given by Fabricius to a very different species*, prior to the publication of *Entomologia Britannica,* I have named it *M. glabratus.* The smallest figure is drawn from the identical specimen from which Mr. Marsham drew his description, the other from var. *β.* I have seen

* MELÖE PUNCTATUS.

M. *punctata,* atra, thorace elytrisque varioloso punctatis. *Fabr. Ent. Syst.* 2. 518. 4.
Syst. Eleut. 2. 588. 6.

M. *punctata,* atra, opaca, thorace plano quadrato, elytris punctis plurimis impressis.
Panz. Faun. Germ. Init. 10. *tab.* 16.

Long. Corp. 1 unc.

Habitat in Germaniâ, Lusitaniâ. Communicavit amicus Sieber.

Mus. Britannico; Dom. Leach, MacLeay, Milne.

Fabricius described this insect from a specimen in the British Museum; and in his description observes, "Habitat in Angliâ." This however being extremely doubtful, I have not ventured to insert it as such without further proof; it is therefore introduced, to exhibit in what respects it differs from the foregoing species. Panzer has given a tolerable figure of it, and observes, "alia est et omnimodò distincta species a Melöe punctata Fabricii." This however is incorrect, as his figure and description agree very well with the identical specimen still preserved in the British Museum, from which Fabricius described it.

seen but four specimens of this variable insect, and all of them are females; but from the structure of their antennæ I doubt not their belonging to this family. I cannot here avoid returning thanks to Dr. Latham for his great liberality in giving me his only specimens of this insect.

6. MELÖE VIOLACEUS.

M. violaceus, capite thoraceque punctatis, elytris rugosis.

TAB. VII. Fig. 3. 4. 5.

M. *violaceus,* corpore toto violaceo, thorace posticè emarginato. *Marsh. Ent. Brit.* i. 482. 2.

M. *tecta.* *Don. Brit. Ins. vol.* vii. *tab.* 240.

Long. Corp. 6 lin. ad 1 unc. 3 lin.

Habitat in Angliâ, Maio vulgatissimus, herbis variis victitans.

DESCR. CAPUT violaceum, punctis plurimis distinctis impressis. *Antennæ* subpilosæ, cæruleo-violescentes, apice piceæ.

THORAX violaceus, punctis impressis, posticè marginatus emarginatusque.

ELYTRA non valde rugosa, violacea, apice acutiora.

ABDOMEN atrum, supra maculâ violaceâ rugosâ in singulo segmento, subtus omni segmento posticè subrugoso violaceo.

PEDES violescentes.

β Thorace canaliculato, elytris magis rugosis quam in α, colore viridescente.

γ Thorace puncto utrinque excavato, alias β similis, at minor. Mus. Dom. Kirby.

δ Antennis elytrisque longioribus, elytris minùs rugosis, abdomine subtus minùs violescente quam in var. α.

ε Multò minor, alias α similis.

The

The principal distinction between this and the following species is very slight; the thorax of this being more notched and margined behind than in *M. proscarabæus*, and its colour more violet. *M. similis* of Mr. Marsham is certainly no more than a variety, differing in having longer elytra, a circumstance often occurring in the different species of the genus.

7. Melöe proscarabæus.

M. niger, capite thoraceque punctatis, elytris rugosis, lateribus capitis, thoracisque pedibus antennisque violescentibus.

Tab. VII. Fig. 6. 7.

Scarabæus mollis e nigra viola nitens.
List. Scarab. Ang. 392. 27.

M. *proscarabæus*, corpore violaceo. *Linn. Fn. Sv.* 227. 826.
* *Syst. Nat.* ii. 697. 1.
Fabr. Syst. Ent. 259. 1.
Fabr. Sp. Ins. ii. 327. 1.
Mant. Ins. i. 215. 1.
Gmel. Syst. Nat. 2017. 1.
Villars Ent. i. 397. 1.

M. *proscarabæus*, corpore violaceo, scabro.
Oliv. iii. *no.* 45. 5. *tab.* 1. *f.* 1.

M. *proscarabæus*, corpore violaceo.
Fabr. Ent. Syst. i. b. 517. 1.
Syst. Eleut. ii. 587. 1.

M. *proscarabæus*, corpore suprà atro, subtùs violaceo.
Marsh. Ent. Brit. i. 481. 1.

Long Corp. Maris 1 unc. 2 lin.
Fœm. 1 unc. et 7 lin.

Obs. Sæpe variant staturâ minori.

Habitat

Habitat in Angliâ, Galliâ, Germaniâ, vulgatissimus, plantis victicans.

DESCR. CAPUT punctatum, lateribus violescentibus. *Antennæ* violescentes, apice piceæ.

THORAX punctatus lateribus violescentibus posticè marginatus. *Pectus* et *Epigastrium* violescentia.

ELYTRA rugosa, nigra, minimè nitida.

ABDOMEN maculâ rugosâ in singulo segmento supra; subtus rugosum marginibus segmentorum exceptis.

PEDES violacei.

β Capite thoraceque violescentibus.

There can be no doubt that this is the *M. proscarabæus* of Linnæus, as it agrees exactly with the description in the *Fauna Suecica.* In the specific character he describes it, "corpore violaceo," but in his description he observes, "totum animal molle est et atrum; pedes, antennæ et abdomen paulo magis violacea." The former character applies to *M. violaceus,* and the latter to *M. proscarabæus,* which he most probably considered as the same species. Latreille is also of this opinion; but erroneously considers *M. punctatus* in the same light.

8. MELÖE TECTUS.

M. niger, capite thoraceque punctatis, elytris subrugosis elongatis, antennis medio crassioribus.

TAB. VII. Fig. 8. 9.

M. *tecta*, atra, elytris abdomine haud brevioribus, antennis medio crassissimis. *Panz. Faun. Germ.* 10. 14.

Long. Corp. Maris, 9½ lin.
Fœm. 10 lin.

Habitat in Angliâ et Germaniâ infrequens.

DESCR.

DESCR. Caput nigrum, obscurè violescens, punctis plurimis impressis. *Antennæ* purpureo-violescentes, articulis tribus intermediis valdè incrassatis, apice obscurè piceæ.

Thorax subquadratus, punctatus, posticè vix emarginatus marginatusque.

Elytra elongata, subrugosa, nigra, nitida.

Abdomen breve, glabrum, oculo armato sub-rugosum.

Pedes purpureo-violescentes.

β Fœm. articulo primo tarsi posterioris basi luteo.

M. tectus is very nearly allied to *M. proscarabæus*, but may be readily distinguished from it by its more smooth elytra and thickened antennæ. The specimens from which the figures are taken, were caught in a wood near Hampstead, in copulation, about the latter end of June. Mr. Donovan has given a figure of *M. violaceus* for this species in his *British Insects*, plate 240. Mr. Marsham in his work appears to doubt whether this insect be not a variety of *M. proscarabæus*; but I suspect he had not seen the insect at the time he wrote his *Entomologia Britannica*, or he would have introduced it as a well marked species.

It may not be uninteresting to collectors to observe, that all the species of this genus, except *M. maialis*, shrink so much after death, that it is necessary to remove the contents of the abdomen, and to fill it to the natural size with cotton; which may easily be done, when the insect is in a recent state, by making an incision on the under side.

REFE-

REFERENCES TO THE FIGURES.

Tab. VI. Fig. 1. Melöe variegatus, male.
2. ———————— female.
3. M. maialis, male.
4. —————, female.
5. M. cicatricosus, male.
6. ————————, female.
7. M. autumnalis, male.
8. ————————, female.
9. M. brevicollis, female.

Tab. VII. Fig. 1. M. glabratus, female.
2. ————————, female, var. β.
3. M. violaceus, male.
4. ————————, female.
5. ————————, male, var. ε.
6. M. proscarabæus, male.
7. ————————, female.
8. M. tectus, male.
9. ——————, female.

MISSOURI
BOTANICAL
GARDEN.

IV. *On Artificial and Natural Arrangements of Plants: and particularly on the Systems of Linnæus and Jussieu. By William Roscoe, Esq. F.L.S.*

Read November 6th, 1810.

> ORDINES NATURALES valent de *Natura* Plantarum;
> ARTIFICIALES in *Diagnosi* Plantarum. LINN.

THAT nature has impressed upon the individuals of her vegetable kingdom characters sufficient to enable us, not only to distinguish them from each other, but to form them into their proper families and combinations, cannot be doubted. Nor will it be denied that the arrangement of a system of vegetables, founded upon true natural distinctions, would be in the highest degree gratifying. It is not therefore surprising that so many attempts have been made to accomplish this most desirable object; but attractive and splendid as it may be, and certainly as it is known to exist, it is not likely to be ever fully disclosed to our view.—" The majesty of nature" glances before our sight, but as often as we attempt to retain her, she eludes our efforts.—Her vegetable productions are so numerous, their characteristics often so difficult to ascertain, they are related to each other by so many

many ties, that it is in vain to expect that we shall ever be able clearly to define them, and accurately to seize upon the true distinctions; so as to combine the whole in the precise order in which they were primarily disposed by her hand. In the mean time, the necessities of human life, no less than the objects of science, require that some mode should be adopted which should enable us to distinguish plants from each other, and to designate them by their appropriate names, although we may not be able precisely to ascertain their natural connections and relative situations: and for this purpose it became indispensably necessary to have recourse to art; not to overthrow or oppose nature, but to assist us where she deserted us, to guide our steps till we could again recover her track, and to furnish us with a lamp till we were again illuminated by the beams of day.

Happily for the world, the formation of such a system was undertaken by the illustrious Swede whose name it bears; and certain it is, that it could not have fallen into abler hands.—With the conviction of the real existence of natural genera and orders, no one was more deeply penetrated; and to interfere with these relations as little as might be consistent with his primary object of a complete arrangement of the vegetable world, was his constant solicitude. For the creation of this system he did not, however, wholly depend upon the materials supplied by his predecessors. The systems of all of them were discarded, or only so much of each of them retained as appeared to suit his purpose; but the most valuable part was supplied from his own resources. To whatever period we may assign the discovery of the sexual system, it was he who first demonstrated it in unambiguous and decisive terms, and who applied this great discovery to the formation of an arrangement of Plants, which comprehends and defines every individual of the vegetable world. In executing

this great task, he has placed the science of Botany upon a firm and immoveable foundation ; and if he has at any time erred in the application of his own principles, it has been rather from an unconquerable reluctance to interfere, more than was necessary, with the dispositions of nature, than from the pride of erecting a system which should contravene her works.

That the system thus formed is an artificial, and not a natural one, must be admitted ; and that it was always so considered by Linnæus, is evident from all his works. Yet this characteristic is not to be taken without some limitations. And in the first place it may be observed, that by the mode of arrangement which he has adopted, the major part of all known vegetables are formed into their great natural combinations in such a manner as scarcely to be susceptible of further elucidation.—Again, the *genera* of Linnæus are uniformly natural ; or at least display such trivial exceptions as to oppose no objection of any moment ; and this purity in his genera may be considered as of the utmost importance to the character, not only of his own, but of any system. It is therefore only with respect to the place which each genus occupies in his system, that any solid objection can be made ; and if this be so situated as to be readily discovered, even although it may not in every instance be found amongst its nearest congeners, it is a defect which may be remedied by an accurate reference, and which as it is occasioned, so it must be excused, by the universality and facility of the system. It would perhaps be too much to say that such an arrangement could not have been effected with less violation of natural affinities ; but certain it is that with these affinities he was well acquainted, and the preservation of them was constantly in his view ; insomuch that, notwithstanding its acknowledged defects, it may, by a due attention to its exceptions, be studied as a natural system with considerable

considerable advantage; whilst, at the same time, it affords an universal key through every department of the vegetable world.

The approbation with which the arrangement of Linnæus was received on its promulgation, and the subsequent adoption of it into general use, may be considered as the most unequivocal testimonies of its excellence. It is true, exceptions have been taken against particular parts, and alterations suggested in departments of minor importance, even by the very editors of his works. To have expected perfection in the first outline of a science, the materials of which are continually increasing, would be unreasonable; and these alterations, instead of derogating from, do homage to the system which they correct. The period however is now arrived which is to try its stability.—A rival has of late risen up, and has already become truly formidable.—Under the patronage and by the influence of a neighbouring nation, this rival now comes forward, and demands universal homage. Its advocates are not only numerous, but learned; not only acute, but earnest.—That their influence is daily increasing cannot be doubted; and the crisis is now arrived when their opinions must be either submitted to, or resisted.

Notwithstanding the favourable reception given to the sexual arrangement of Plants, it is well known to have made but little progress through the southern nations of Europe; and the French in particular refused implicitly to admit the novel doctrines of the Swede. In Botany, Tournefort continued to be their guide. In Zoology, Buffon directed their steps; and their example induced the Italians, and in some degree the Germans, to follow the same track. From various circumstances, and particularly from the great accession of individuals of the vegetable kingdom

to

to which the arrangement of Tournefort is wholly incompetent, his authority has declined; but Linnæus has not always gained the followers that Tournefort has lost. Other leaders have risen up, and proposed arrangements and nomenclatures of plants wholly different from those of Linnæus; and in particular, the successive efforts of the distinguished family of Jussieu have raised a standard to which many of the most eminent botanists of the present day think it an honour to resort.

The system of the Jussieus, as originally proposed by Bernard, and afterwards illustrated and amplified by Antoine Laurent de Jussieu, has higher pretensions than that of Linnæus, and professes not only to unite together in their natural orders such plants as are related to each other, but to form a complete arrangement, in which every known plant may be found in its proper situation, and every unknown plant may when discovered take its place among its congeners. A system, in short, which unites all the advantages of a natural arrangement with the elucidation of a technical one; and comprises within itself all that is requisite to botanical science*. If such a system could be established, it is evident that it must render that of Linnæus of no value; or, rather, must exhibit it as calculated only to mislead the student, and amuse him with words, instead of communicating to him substantial knowledge.

In the execution of his task the younger Jussieu had peculiar advantages. Since the time of Linnæus the accessions to the science have been immense; not only from the introduction of new genera and species, which to him were wholly unknown, but from the greater attention which has been paid to the exa-

* "His genuina mox substituitur scientia, quæ vegetantium non modo *nomina*, sed et *naturam* inquirens integram eorum organisationem cunctos caracteres prospiciat, &c."
Jussieu, Introduc. p. 67.

mination

mination of the individuals of the vegetable kingdom; the modes of their existence, economy, and reproduction, and various other particulars connected with botanical studies. To enumerate merely the writers on these subjects whose works are entitled to approbation, would be to form a considerable catalogue. That the mass of information thus obtained has thrown great light on the physiology of plants, cannot be doubted; and no undertaking could be more commendable, or more worthy of the talents of the illustrious scholar who engaged in it, than that of endeavouring to apply such knowledge to general use, and showing the affinities and connections which nature has established between the individuals of her vegetable kingdom. The great utility of such a work is obvious; its foundations are deeply laid in the principles of nature; and in order to make a proficiency in such study, it is necessary to examine far beyond the exterior phænomena which are requisite for an artificial arrangement. Hence the science acquires new dignity; and, instead of being conversant merely with exterior forms and nominal distinctions, becomes acquainted with the laws and operations of nature in one of the most important of her functions; that by which she elicits from unorganized matter the means of support for animal life.

Of the ability with which Jussieu has executed his task, and the impulse which he has given to these pursuits, every botanical student is well informed; nor is it possible to recommend his writings, and those of several of his countrymen who have adopted, and perhaps improved upon his system, too earnestly to their attention, as elucidating the natural characters and relative connections of a considerable portion of the vegetable kingdom. This, however, is not the whole to which these authors lay claim

It

It is not sufficient that we admit, in its fullest extent, the expediency and utility of studying the natural arrangements of plants, but we are now required to adopt this new system as a general arrangement and nomenclature, in the stead of that of Linnæus; to discard his labours, as of an inferior and a succedaneous kind; and to hail the moment when the great event, which he is said to have himself considered as the destruction of his own system, has actually taken place.

It is true the triumph of the new system has not yet been announced, even by its warmest promoters, in distinct and unambiguous terms; but the very arrangement of a *Genera Plantarum*, like that of Jussieu, offers it to universal use; and the manner in which it is spoken of, both by him and his followers, sufficiently demonstrates that this is its ultimate object, to the total exclusion of that of Linnæus. In the very introduction to his work, Jussieu has himself sufficiently disclosed his views, by the objections which he has brought against the system of his illustrious predecessor; the tendency of which is not merely to show that it is imperfect when considered as a natural arrangement, but that even as an artificial one it is not entitled to a preference. In arranging these objections Jussieu has observed, "1. That the distinctions of the Linnæan system are sometimes founded on the minuter organs of vegetables, requiring the use of glasses and instruments. 2. That the method is arbitrary; the distinctions of his classes being derived from some one part only; and that from a deficiency of real characters he is compelled to adopt such as are inconstant, which he uses frequently and promiscuously, to the exclusion of those which are substantial. 3. That in determining by the number of stamina, not only genera nearly related to each other are frequently

frequently divided, but that even species are separated*." To these he adds many other objections of minor importance, and afterwards asserts, that "if a preference is to be given to that method which is the most easy, and the most agreeable to the order of nature, that of Tournefort is the most perfect; that the arrangement of the Linnæan system is sometimes perplexed, its designations difficult, and its connections of plants not related still more frequent; that it is indebted for its general reception among botanists to the conciseness and certainty of its characters, the number of individuals arranged under each order, and the improved nomenclature by generic and specific names†." To this, however, he adds, "that all such systems are arbitrarily constructed, that they exhibit a factitious science, terminating not in the knowledge, but merely in the defining and naming of plants; and that, in short, they can only be considered as a prelude to the science of botany, affording a succedaneous arrangement of plants, until, by repeated labours, they can be reduced into a proper and natural series‡."

* "Systema tenuissimis interdum innititur organis, oculo armato et acu divellente tunc difficilius observandis. 2. Præterea arbitrarium, systematico errore, dum multiplicatis classibus omnes earum designationes ex unicâ parte molitur depromere; tunc solidorum caracterum penuriâ essentialibus promiscuè addit inconstantes, quos etiam, utpote numerosiores frequentius usurpat, prioribus plerumque neglectis. 3. Staminum numero sic discrepant non tantum genera cognatissima, sed et species congeneres ab invicem demovere nesciæ, &c."—*Jussieu, Introd.* p. 40.

† *Jussieu, Introd.* p. 41.

‡ "Hæc autem systemata arbitrariò constructa, scientiam exhibent factitiam, non naturalem, et plantis non penitus cognoscendis, sed tantùm compendiosè definiendis ac certò nominandis addictam. Habenda sunt igitur quasi præludia botanica, aut repertoria aptè digesta, indicisque non alphabetici, alii aliis commodiores, in quibus, secundùm signa in faciliorem propriæ investigationis laborem mutuique Botanicorum commercii nexum admissa pacto ordine disponuntur plantæ, donec feliciùs iterata meditatione in seriem verè naturalem distribuantur."—*Jussieu, Ibid.*

From these and other observations to be found in the writings of Jussieu, it is not difficult to perceive that the system there proposed was intended to replace that of Linnæus; which from that time was presumed to be no longer necessary to the student; and these pretensions have been enforced by subsequent writers, who have adopted the arrangements of Jussieu. In his Discourse on the Study of Botany, prefixed to his "*Tableau du Règne Végétal*," M. Ventenat has not only collected the authorities of several preceding botanists in derogation of the system of Linnæus, but has even made use of the authority of Linnæus against himself. In this, indeed, he has in some degree followed the example of Jussieu, who has availed himself of several passages from the writings of Linnæus to prove his acknowledgement of the superiority of a natural method*; but this concession has been carried by both these writers to an extent which Linnæus certainly never intended, and which it will not in any candid construction bear. If we admit the interpretation put upon the writings of Linnæus, he has himself acknowledged the futility and proclaimed the downfall of his own system, and has consequently released his followers from engaging in its defence.

"This system," says Ventenat, "has had its partisans and its critics. Some have said with Royenus,

> "Si quid habent veri vatis præsagia, Floræ
> Structa super lapidem non ruet hæcce domus;"

whilst others have not hesitated to assert with Alston, that the sexual system is full of difficulties, and that it is the least

* "Classes quo magis naturales, eo *ceteris paribus* præstantiores sunt. Summorum Botanicorum hodiernus labor in his sudat, et desudare decet.—Methodus naturalis hinc ultimus finis Botanices est et erit." *Linn. Phil. Bot. n.* 206.—"Primum et ultimum in Botanice quæsitus est methodus naturalis.—Hæc adeò a Botanicis minùs doctis vili habita, a sapientioribus verò tanti semper æstimata, licet detecta nondum &c."—*Linn. Class.* p. 485. *ap. Jussiæi Introd.* p. 43.

natural

natural of all those that have been invented for the classification of plants.

"At this period," continues M. Ventenat, "when experience has enabled us to appreciate the value of the sexual system, and envy and adulation are alike removed, we may assert, without fear of being suspected of partiality, that Linnæus has himself acknowledged the inconveniencies attending the sexual system. This man of genius did not suffer himself to be seduced by the delusions of self-love; and he has frankly acknowledged that his principles had sometimes compelled him to deviate from the track of nature.—Let us not however attach to the sexual method greater importance than was given to it by its author. Those who have read his works ought to know that artificial methods were only considered by him as introductory to the natural method.—In fact, the celebrated naturalist of Upsal was all his life a zealous defender of natural combinations, as may be proved, in the first place, by different axioms interspersed in his works. 2. In the *Eulogia* which he has conferred on those botanists who have endeavoured to follow the traces of nature. 3. In the fragments which he has left us of natural orders, and at which he never ceased to labour*." After quoting a passage from Linnæus in justification of these sentiments†, he adds, "It is remarkable that this great man, after having in his public lectures demonstrated plants according to the sexual system, in his private conferences with his most distinguished pupils developed the principles by which he had been guided in the esta-

* *Ventenat, Discours sur la Botanique.* V. *Tableau du Règne Végétal,* t. i. pp. 17, 18.

† "Dici et ego circa methodum naturalem inveniendam elaboravi; bene multa quæ adderem obtinui; perficere non potui, continuaturus dum vixero. Interim quæ novi proponam. Qui paucas quæ restant benè absolvit plantas, omnibus MAGNUS ERIT APOLLO." *Class. Pl.* p. 485.

 blishment

blishment of his natural orders, and by his learned dissertations prepared the way which led to the perfect knowledge of vegetable productions*."

Now if, by these and similar observations, it be meant merely to prove that Linnæus was fully convinced of the importance of studying the natural affinities of plants, and that he considered it as the highest department of the science, there can be no difficulty in acceding to them; but if they be intended to show that he was of opinion that any arrangement of plants on a natural system was to be preferred to, and might supersede the use of, his own artificial arrangement, (and if this was not the object in view, the introduction of the concessions of Linnæus is of no avail,) it may justly be observed that these authors have either mistaken or not fairly represented the meaning of Linnæus.—That natural affinities are to be studied, and that this department of the science cannot be too diligently cultivated, was his decided conviction. He has even frequently contemplated the possibility of an arrangement which should include in their natural orders the whole vegetable kingdom; but in alluding to such an event, it was always as a mere possibility, of the completion of which he had scarcely a distant hope: still less would he have been inclined to admit that any such arrangement, even if it could be formed, could supersede that which he had with so much assiduity demonstrated, and to which he invariably adhered to the close of his life. To collect together detached sentiments from his writings for the purpose of proving that he preferred a natural method to his own, as a general arrangement, is to pervert his opinions, to render him the adversary of his own labours, and the suicide of his own fame. To the firm and inflexible conviction of the practical superiority of his own method, all the

* *Ventenat, Discours,* p. 19.

passages

passages cited by these writers are strictly reconcileable; but if any doubt remained on this subject, it would readily be dissipated by a reference to his works. Even in the brief introduction to his own fragments of natural orders, he has placed it in so clear and perspicuous a light, that it is impossible to mistake it. "Natural orders," says he, "cannot constitute a method without a key. In distinguishing plants, the artificial method is alone of any avail; a natural method being scarcely, or rather not at all, possible. Natural orders are useful in acquainting us with the nature of plants, but an artificial method is requisite to their discrimination*." And to this he has added, in language that must for ever remove all ambiguity on this head, "Those persons who, instead of a natural method, have arranged plants in fragments of such a method, and reject an artificial one, seem to me to resemble those who, having a convenient and well roofed house, overturn it, in order to build one in the place of it of which they are unable to finish the roof†."

That Linnæus has in many parts of his works highly commended those who have distinguished themselves in investigating the natural relations of plants, is certain; but to suppose that by this he meant to approve of those who pretended to have formed a natural arrangement, is to attribute to him an opinion which he has disavowed in the most pointed terms. "A real botanist," says he, "will investigate the natural order of plants when it can be discovered;" but, "he will not boast of having

* "Ordines naturales non constituunt methodum absque clave.

"Methodus artificialis itaque sola valet in diagnosi, cum clavis M. naturalis vix ac ne vix possibilis sit.

"Ordines naturales valent de natura plantarum—Artificiales in diagnosi plantarum."

† "Qui loco methodi naturalis disponunt plantas secundum ejus fragmenta, *respuuntque artificialem*, videntur mihi iis similes, qui commodam et fornicatam domum evertunt, inque ejus locum reædificant aliam, sed tectum fornicis conficere non valent."

discovered

discovered a system perfectly conformable to the laws of nature*." And among his diagnostics of pretended botanists he particularly includes that of "presuming that they are acquainted with a natural method†."

Instead of dwelling further on the endeavours of the French botanists to invalidate the labours of Linnæus by resorting, as Ventenat has done, to the well-known censures of Haller and others, I shall in the sequel of this paper endeavour to ascertain the relative merits of the two systems which now principally offer themselves to our acceptance; in which I shall attempt to show,

I. That the method of Jussieu is not in fact a natural, but an artificial one.

II. That, as an artificial method, the system of Jussieu is inferior to that of Linnæus.

III. That the artificial and natural methods of arrangement are, and must always remain, essentially different from each other, as well in the means employed as in the objects to be attained.

I. Could we suppose it possible for a person to be born with some superior instinct, which enabled him to decide at first sight on the character of a plant, and the genus and order to which it belonged, we might perhaps be induced to assent to his decisions, and allow him arbitrarily to establish his system. But, even with this conviction on our minds, circumstances might arise to shake our belief in his infallibility; and if, like Bernard de Jussieu, he should, in one short order of only eight genera, unite together the *Bromelia* and the *Hydrocharis*, the *Musa* and the *Galanthus*, we should perhaps feel inclined to ask upon what

* "*Botanicus verus*, ordinem naturalem, ubi patet indigitet."—*Regn. Veget.* 27.
"Nec naturalissimam structuram oratorio sermone ebuccinat."—*Phil. Bot.* p. 294.

† "Botanophili Fallaces—Methodum naturalem sibi notam crepant."—*Regn. Veget.* 27.

similarity

similarity in the flower, root, or seed, he had founded his opinion.—Nor would it be sufficient for the ends of science, if the decisions of this superior being were always free from error. For this purpose, we must not only know, but must be enabled to communicate our knowledge to others; and how this could be done, without our giving some specific reasons for our convictions, and for the assent to them which we claim, it is not easy to conceive.

These difficulties were perceived by the younger Jussieu; who, instead of giving us a mere list of genera, arbitrarily arranged in orders, characterized from some one of the principal genera in each order, has condescended to explain the grounds of his opinions by an arrangement or system, founded on the visible and tangible parts of the plants themselves. From this moment it was evident that no supernatural intelligence had dictated the arrangement; which, notwithstanding its more imposing title, was to be judged of, like all other arrangements, only by its superior ingenuity, accuracy, and utility. It might indeed be more skilfully executed than the system of Linnæus; but still it appealed to the same organs of sense, and submitted to be judged by the same rules.

In one view of the subject, all modern systems may indeed be denominated natural, as they are all deduced from some part, property, or peculiarity, of the plants themselves: those of Morison, Ray, Herman, and Gærtner, from the fruit; of Tournefort, Knaut, and Rivinus, from the corolla; of Magnol, from the calyx; that of Linnæus, chiefly from the number, proportion, and situation of the stamina; and that of Jussieu, from the mode of germination, and situation of the stamina; but principally, like that of Tournefort, from the number and disposition of the petals. It is true, that some of these methods may

be

be greatly preferable to others; but it is equally true, that there is scarcely one of them that does not possess some advantages which the others do not afford, and which have induced their respective authors to give them the preference. Some of them may even approach nearer to a natural system than the rest; or, in other words, may occasion less separation among plants which have a real affinity: others may pay less regard to this object, and may in some degree sacrifice it for the purpose of giving a more correct, extensive, and intelligible nomenclature; but the distinctions on which they are founded are equally natural; although it may not be possible for any method that is confessedly founded upon the sensible phænomena of the vegetable kingdom, whatever its pretensions may be, to unite together the families of plants in the strict natural orders and relative situations, or occasionally to avoid separating those which the general convictions of our senses assure us ought to be united.

If however it be still asserted that the system of Jussieu is to be preferred, as exhibiting a more exact conformity to the affinities of nature than that of Linnæus, may we be allowed to ask upon what this superiority is founded, and in what particular part of the system it consists? Are the affinities of plants more likely primarily to result from the petals, or from the stamina? from the part which shelters the immediate organs of reproduction, or from those organs themselves, connected as they are with the very nature and fructification of the plant? Supposing a doubt to arise whether a plant ought to be arranged with such as agreed with it in the corolla, or in the stamina, how would a skilful naturalist be inclined to decide? or which would he consider as the most powerful affinity? In whatever manner the orders of the two Jussieus may have been formed, they exhibit, at

at least, as many incongruities to the general observer, as the classes and orders of Linnæus. What would such an observer, unacquainted with the secret chain employed by these authors, say to the union in the same class of the *Palmæ* with the *Junci?* the *Musæ* with the *Hydrocharides?* the *Proteæ* with the *Atriplices?* the *Jasmineæ* with the *Scrophulariæ?* the *Rhododendra* with the *Campanulaceæ?* or, in short, to the many tribes apparently wholly discordant from each other, in conformation, in habit, in qualities, which occur in almost every class? Can the system of Linnæus exhibit any associations more revolting to his conceptions, or which would tend more decisively to convince him that, whatever may be their pretensions, these systems are in fact equally artificial, and that their assumed natural affinities are nothing more than a partial resemblance, founded on some peculiarity of habit or conformation, which may serve to decide its situation in a nomenclature, but has often little or no relation to the real and essential nature of the plant?

II. If such be the fact, our inquiry will now take a different shape. It is no longer a question as to the superiority of one system over another, but a question of degrees as to the superior execution of a similar method. Let us then, whether we choose to denominate them both natural or both artificial, briefly compare the rival arrangements of Linnæus and Jussieu.

The most important difference between these two methods consists in a preliminary distinction made by Jussieu, by which he divides the vegetable kingdom into three departments, to each of which he applies a separate mode of arrangement, whereas Linnæus applies his method indiscriminately to the whole. By the plan of Jussieu we are in the first place to ascertain whether the plant which we examine rises from the seed without a cotyledon,

with one cotyledon, or with two cotyledons*; and having determined this point, we then proceed by other rules to distinguish the individuals in each department. By that of Linnæus we take the plant without any regard to its mode of germination, and from the parts of fructification immediately determine its character, and assign it to its proper genus. That the mode in which plants arise from the seed †, or, more strictly speaking, that the seed itself, of which the cotyledons are formed, affords a true natural distinction, cannot be doubted; but in estimating the advantages of this distinction, we must also estimate its disadvantages, and form our decision upon the whole result. The object attained by Jussieu is the separating from the great mass of vegetables, two portions; one of which, the acotyledones, comprehends the cryptogamous

* This distinction it may be observed was made by Linnæus himself, as the foundation of his *Regnum Vegetabile*; with the necessary and indeed indispensable addition of the *Polycotyledones*.

"Tribus vegetabilium tres vulgo numerantur.

Monocotyledones.	Fruges 1. 2. 3.
Dicotyledones.	Plantæ 4. 5.
Polycotyledones.	Rhizophora.
Acotyledones.	Cryptogamæ 6. 7. 8. 9."

Linn. Reg. Veg. 3.

† In his *Philosophia Botanica*, Linnæus has carried this method much further than Jussieu has done; having divided the Monocotyledones into

perforatæ.	Gramina.
unilaterales.	Palmæ.
reductæ.	Cepa.

And his Dicotyledones into

immutatæ.	Legumina &c.
plicatæ.	Gossypium.
duplicatæ.	Tetradynamia &c.
obvolutæ.	Helxine.
spirales.	Salsola &c.
reductæ.	Umbellatæ.

And in his Polycotyledones he enumerates Pinus, Cupressus, and Linum, p. 102.

plants

plants of Linnæus, and forms the first class of Jussieu: the other, the monocotyledones, includes the gramineous and liliaceous plants, and forms the second, third, and fourth of his classes. These distinctions may be admitted to be well founded*; but what are the advantages they afford over those of Linnæus? who has also referred the Cryptogamous Plants to a distinct class by a peculiarity equally natural, the inconspicuity of their flowers, and with a few exceptions, not perhaps difficult to have been avoided, has arranged the gramineous and liliaceous plants in orders as natural as those of Jussieu.

In this respect, then, the two systems are nearly upon an equality; and to say the truth, it was almost impossible for any naturalist, upon a subject where the grounds of distinction were so numerous and so manifest, to adopt a different conclusion. But if nothing be gained in this instance by Jussieu, can we also say that nothing is lost? Is it no disadvantage, on discovering an unknown plant, to be under the necessity, before we proceed to its further investigation, of ascertaining in what manner it commenced its growth, and whether it rose from the seed with one or with two cotyledons, or without any cotyledon whatever? To whom are we to apply for this information? Or are we to be turned round to ascertain the primary distinction by the sensible

* Yet it must be observed that in the numerous tribe of the *Orchideæ*, which Jussieu has arranged among his Monocotyledonous Plants, others have not been able to discover the slightest trace of a cotyledon. For instance, " ORCHIS MORIO. Acotyledoneus, ne vel minimo placentæ rudimento unquam exserto."—" LIMODORUM VERECUNDUM. Embryo minutus, acotyledoneus." V. *Salisbury in Linn. Trans.* tom. vii. pp. 31, 32.—Again, some plants have been discovered to have more than two cotyledons, as in *Pinus*, and *Dombeya*; the cotyledons of the latter of which "are distinctly four." *Smith's Introd. to Bot.* pp. 98. 289. And even the Mosses are said to have numerous seed-lobes, " so that these plants are very improperly placed by authors among such as have no cotyledons." *Ib.* p. 190.

 appearance,

appearance, and instead of saying that the plant rose from one cotyledon and is therefore a grass, that it is a grass and therefore rose from one cotyledon? At all events, it imposes a difficulty on the student without affording an adequate advantage, and throws a doubt over the great mass of individuals of the vegetable kingdom, to be removed only by inquiring into the mode of their early growth, in order to separate from the rest some detached plants which are equally as well separated by other distinctions quite as natural and more permanent, and which it is indeed impossible should be confounded with them.

This peculiarity in the method of Jussieu being considered, the two systems, as far as they regard the great mass of the vegetable kingdom, may now be placed in more direct comparison. Linnæus has founded his primitive distinctions on the number and proportions of the stamina; not omitting the diversities arising from their situation. Jussieu, disregarding in his primary distinctions the number of the stamina, has recourse merely to their situation, which he distinguishes into three different manners, as being placed upon, around, or below the germen, under the appellations of *Epigyna*, *Perigyna*, and *Upogyna**. This distinction is applied however only to his apetalous and polypetalous plants, the monopetalous plants being distinguished not immediately by the stamina, but by the situation of the corolla. This necessarily compels him to commence his definitions by the corolla, and accordingly he first divides his dicotyledonous

* With respect to these distinctions, the most important in the arrangement of Jussieu, the reader (μόνον Ἄῤῥην ἔστω) may consult Mr. Salisbury's "Observations on the Perigynous Insertion of the Stamina of Plants;" where he has undertaken to show that such perigynous insertion is entirely factitious, and that there is no instance whatever, in the whole vegetable kingdom, of stamina being inserted in the calyx. V. *Trans. Linn. Soc.* vol. viii. p. 1.

plants

plants into *apetalous*, *monopetalous*, and *polypetalous*. Of these the apetalous are to be again subdivided by the stamina, which are considered with respect, not to the number, but the situation; and as in the absence of the corolla the stamina are inserted *directly* into the style or germen, this is denominated the *absolutely immediate insertion* of the stamina, constituting the fifth, sixth, and seventh, of his classes. The *monopetalæ*, distinguished into separate tribes by the corolla, which is for the most part staminiferous, and is therefore said to exhibit the *mediate insertion* of the stamina, form the eighth, ninth, tenth, and eleventh classes; and the *polypetalæ*, characterized again by the situation of the stamina, the insertion of which is here called *simply immediate*, as it *accidentally* varies at times into the mediate insertion, or in other words is found sometimes on the germen and at others on the corolla*, form the twelfth, thirteenth and fourteenth of his classes; his fifteenth and last being composed of diclinous or irregular plants, not properly reducible to any other head.

Independent, therefore, of the distinctions arising from the cotyledons, which, however well founded, have been shown to be of little practical utility, the system of Jussieu is the system of Tournefort; in which Jussieu has, it seems, discovered advantages resulting from the incidental connection between the stamina and the corolla, of which Tournefort himself was not aware†. It must

* " Insertio immediata vel est *absoluta* in mediatam mutari nescia, dum corolla supprimitur, ut in apetalis; vel est *simplex*, in mediatam *fortuitò* mutabilis, dum corolla existens non gerit stamina, et tamen ferre interdum potest, ut in plerisque polypetalis," &c. *Juss. Gen. Pl.* p. 79.

† " Tria inde eruuntur signa primaria, ferè essentialia ac cæteris spectabiliora, jam in Tournefortianâ methodo feliciter adhibita, singula ter dividenda a situ staminum in apetalis et polypetalis, corollæ in monopetalis." *Juss. Gen. Pl.* p. 80.

" On retrouve donc ici une des grandes divisions de Tournefort prise de la corolle, organe très secondaire en lui-même, mais qui, par son union avec un organe principal et essentiel

must also be observed that the primary distinctions of Linnæus extend at once through the twenty-four classes, whilst those of Jussieu, arising from the cotyledons, extend only to three; the secondary, founded on the corolla, form only three more; and the subdivisions of these by the *stamina* and *antheræ*, including the anomalous class of *Diclines irregulares*, form in the whole only fifteen classes, thus obtaining much less in point of distinction by four separate processes than Linnæus has obtained by one.

The consequence of this is, that there are on an average a much greater number of plants in each of the classes of Jussieu than in those of Linnæus. In order to designate these classes, Linnæus has recourse solely to the stamina, from the number, proportion, and situation of which he has formed all his distinctions, which he has comprised in one single expressive word, fully indicative of the grounds upon which the class is founded. Jussieu, on the contrary, in order to arrive at the distinctions of his classes, has taken a more circuitous path, and instead of referring to a single part, and defining it by a single word, has recourse to various peculiarities, as well in the mode of germination as in the fructification. Thus the compound flowers, forming a natural order, are designated by Linnæus by the term *Syngenesia*; whilst Jussieu denominates them *Plantæ dicotyledones, monopetalæ, corolla epigyna, antheræ connatæ.* To say nothing of the inconveniencies introduced into the science by the substitu-

essentiel *dont Tournefort n'avoit pas connoissance,* se trouve passer au premier rang." *Extrait des Registres de la Soc. Roy. de Med. à Paris.*

But had Jussieu preserved a strictly natural method, he would have adopted the distinctions on the cotyledons, as suggested by Linnæus. In deserting these he has evidently fallen into an artificial one, having no connection whatever with the foundation on which his system is built.

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tion of a long definition for an appropriate appellation, the consequence of this diversity in the two systems is in other respects important. The separation of the vegetable kingdom into classes is only one step towards an arrangement. The subordinate divisions of orders and genera require other distinctions. It becomes necessary, therefore, not to expend, as it were, in the formation of the classes those peculiarities which may be applied with so much effect, and which are indeed indispensable in the subordinate arrangements. Of this Linnæus was fully aware; and he has accordingly reserved for this purpose, not only certain particularities in the situation of the stamina, but the whole advantages arising from the corolla, calyx, and nectarium; and, what is of still greater moment, the distinctions dependent on the number and form of the style and stigma. Jussieu, on the contrary, has prematurely deprived himself of many of these distinctive characters, although from the greater magnitude of his classes he has greater occasion for them. Those which arise from the number of the petals, as well as the situation of the stamina, he has applied to the formation of his classes, and in some instances, as in his tenth and eleventh classes, has even resorted to the antheræ for these leading distinctions. The consequences of this will more fully appear by a brief comparison of these arrangements in their subordinate divisions.

According to each of these systems, the classes are divided into orders. Linnæus, still aiming at simplicity, but founding his decisions on strong natural distinctions, has for this purpose recourse to the pistillum, or style, the immediate organ of impregnation, and essential to the formation of the fruit. As a single word has expressed the class, so another word now gives us the order; and to a practical botanist the expression *Pentandria monogynia* suggests the idea of a division of plants including,

among

among many others, the natural order of asperifoliæ; as that of *Pentandria digynia* does of the umbelliferæ. The difficulties under which Jussieu labours now become apparent. He has indeed formed the vegetable kingdom into fifteen classes; under which heads he has arranged one hundred tribes or orders, each consisting of various families of plants supposed to be allied to each other; but when we ask for the distinctions of these orders, or, in other words, by what peculiarities they are to be recognised, and in what terms they are to be described, we find only a series of appellations, mostly derived from some particular genus of plants which is supposed sufficiently predominant to give a name to the order, and which order includes certain other genera which appear to be related to it*. If, however, we are dissatisfied with this mode of distinction, as affording us no determinate idea, nor giving us any clue to discover how such order is formed, we can only have recourse to a comparison of the descriptions placed at the head of each of the orders of which each class is composed. That the Jasmineæ may form a part of the same natural *class* as the Gentianæ, although their relation be not very apparent, may be admitted; because they equally germinate from two cotyledons, and have each a monopetalous corolla, situated beneath the germen: but when we ask why these genera are not also of the same order, we must seek for an answer in the description prefixed to each order in the body of the work; until by a careful perusal and comparison of these descriptions, which in many respects agree, we are at length enabled to determine in what the difference between a Jasmine and a Gentian, a Laurus or an Atriplex, really consists. In this

* Thus th e4th order of the 8th class is denominated *Jasmineæ*, and includes the genera of Maytenus—Nyctanthes—Lilac—Hebe—Fraxinus—Chionanthus—Olea—Phillyrea—Mogorium—Jasminum and Ligustrum.

secondary

secondary part of the system it will therefore scarcely be denied that the advantages of perspicuity and precision are wholly on the part of Linnæus, whatever may be the case as to the natural order of the plants; in which respect, however, it is by no means clear that Jussieu possesses any superiority over his predecessor.

From classes and orders we descend to genera, in the determination of which the chief difficulties of the science consist; but as in some of the orders the number of genera is very great, it has been found indispensably necessary to divide such orders into sections, so as to place each genus in its proper relative situation, and break in as little as possible upon their natural or apparent affinities. This Linnæus and his subsequent editors have endeavoured to do by a kind of collateral arrangement placed at the head of each class, though not strictly conformable to the rest of the system. For the discrimination of these sections there remained ample materials. The stamina and pistils had indeed already been employed in characterizing the classes and orders; but the corolla, as well with respect to the number of its petals as its form and situation, the calyx, the receptacle, the germen, the stigma and the fruit, all offered important marks of discrimination, which have been made use of so as greatly to assist the student, although not with all the beneficial effect that might have been expected, or so as to define with accuracy the relative situation of each genus. The same mode of dividing the orders into sections has also been resorted to by Jussieu; but as he had already employed the corolla and the situation of the stamina in order to characterize his classes, he has been obliged to have recourse in his subordinate divisions to other distinctions. He therefore chiefly employs for this purpose the number of the stamina, and the style, with the addition of the receptacle, and particularly of the fruit. Thus it appears

that the two systems of Linnæus and Jussieu are in this respect nearly a transposition of each other; and that whilst Linnæus begins his great divisions with the essential organs of fructification, and proceeds to characterize his inferior divisions by parts of less natural importance, Jussieu has formed his leading distinctions upon the corolla, and the situation of the stamina; and has employed the number of the stamina and style to divide his orders into sections. Which of these methods is to be preferred the reader will decide; but as they are in fact equally natural, or equally artificial, that which most clearly defines the plant in question, which supplies a concise and intelligible nomenclature, and most effectually assists the student in his researches, is undoubtedly to be preferred: and in these respects it will scarcely be contended that the system of Jussieu is superior to that of Linnæus.

In forming their genera both Linnæus and Jussieu have exerted all their talents. They were both of them equally convinced that these combinations were founded in nature, and ought equally to be adhered to under every mode of arrangement. Here then there can be no comparison, except as to the superior skill exhibited in the composition and description of such genera. Which of them has excelled in this respect I shall not take upon myself to decide; but if the preference is to be given to Jussieu in any instance, it is perhaps in the full and scientific manner in which his genera are defined.

But whatever may be the merits of these rival systems in other respects, there is one objection still remaining against that of Jussieu, which strikingly reminds us of the prediction of Linnæus, and renders it as a nomenclature entirely useless. Unable to comprehend in any of his divisions all known genera, he is compelled to annex to the close of several of his orders many plants,

which he denominates *genera affinia*; besides which, he is obliged to add at the end of his work a long appendix of plants whose proper stations he has not been able to ascertain; not from the want of opportunity for investigation, for many of the plants were obvious; but because they either fall under different classes with equal claims, or are not reducible to any class whatever. As a nomenclature this defect is fatal; for, unless the inquirer can be confidently assured that some part of the system will afford him the information he requires, he is disheartened in his efforts, and relinquishes his search in disgust.

Here, then, the comparison between these rival systems necessarily terminates; and whatever may be the merits of Jussieu as a botanist, it is sufficiently clear that they are not exemplified in the superiority of his arrangement as a nomenclature of the vegetable kingdom. In fact, the inconveniencies arising in such arrangement from its primary distinctions being founded on the mode of germination, from the want of a succinct and explicit division of the classes into orders and sections, and particularly from the unfortunate circumstance of a considerable portion of vegetables not being included in any part of the system, compel us to conclude that, as a nomenclature and series of plants, it is greatly inferior to that of Linnæus; and that, however excellent it may be in some respects, it will never supplant in general use that long established work.

III. That the work of Jussieu, considered as an illustration of the natural affinities of plants, possesses great and intrinsic merit, we may however readily admit; but that the study of plants in their natural orders can supply the want of an artificial system, may safely be denied. In fact, these two methods are as distinct in their objects as they are in their means, and should never be

confounded with each other. The one commences its observations with the obvious and exterior appearances of plants; and, seizing upon the most striking characters, immediately arranges them into their different classes and families. No distinctions are employed but such as are visible, and present; and wherever the plant is seen in its perfect state, it bears upon it its own name and character. As the means thus employed are confined to the exterior of the plant, so the object in view is limited to the mere knowledge of its proper appellation; and as soon as that is attained, the purpose of an artificial system is complete.—A *real* natural system, on the other hand, if such a one should ever be practicable, must be founded on a long and intimate acquaintance with the nature of plants, their habits and places of growth, the form and qualities of their seed, the manner of their evolution, increase, and reproduction, the peculiarities of their radication, their interior substance, whether medullary or concentric, the infinitely varied formation of their vascular system, by which the plant is not only enabled to circulate the juices necessary to its support, but to elicit those peculiar qualities of acids, salts, gums, resins, and aroma, by which they are distinguished, and on which their natural combinations so ultimately depend. When these facts are sufficiently developed, the system then proceeds to arrange the individuals of the vegetable kingdom, not by their exterior phænomena, but by those primitive and secret alliances by which nature has bound them together; uniting such as are most nearly allied, and separating such as have no inherent affinity to each other. In an artificial system, some plain and obvious distinction, such for instance as the number of the stamina, is decisive of the character. In a natural system this must depend on some more remote circumstance, such as the mode of germination of the plant, and which, though deeply founded in nature,

cannot

cannot at the instant be demonstrated, but must for the present be admitted on the credit of the founder. Even to determine the primary distinctions on which such a system should rest, is a matter of no small difficulty: and notwithstanding the concurrent authority of both Linnæus and Jussieu, it is by no means certain that the number of cotyledons with which a plant germinates is the most secure foundation; or whether, for instance, the classification by Gærtner from the seeds themselves is not to be preferred. Hence there arises between the two modes of arrangement this important distinction, that an artificial method, devised and completed by one person, may readily be communicated to another, and is as intelligible to the student as to the preceptor; whilst, on the contrary, the knowledge of a natural system is chiefly confined to the author, and cannot be fully attained by any other person without entering into the same investigations, and ascertaining the same facts; many of which might perhaps afford different results, or lead to different conclusions. Whenever a pretended natural system relinquishes these primary distinctions, and attempts to arrange the genera and species of plants by their exterior phænomena, it is no longer natural but artificial; and the superstructure being wholly different from the basis, it becomes incongruous and absurd; neither furnishing the recondite information which is obtained from the study of the natural relations of plants, nor affording us those advantages of a ready discrimination which we derive from an artificial arrangement. As long as these truths are acknowledged and acted upon, a real progress will be made in the science; and to no country has the world been of late more indebted than to France, for that knowledge and information which a deep inquiry into the recesses of the vegetable kingdom can alone supply; although this country may also boast of many distinguished followers.

lowers. It is however to be regretted, that these eminent men have either not been aware of the true limits of the science which they cultivate, or have not been satisfied to confine their efforts within the bounds which it prescribes; but have endeavoured to establish their system as capable of exhibiting a complete arrangement of the vegetable kingdom, which would render unnecessary all the labours of their predecessors; and still more is it to be regretted, that they should have endeavoured to establish such an opinion on the authority of Linnæus himself, and should have represented him as speaking a language the most foreign from his thoughts, and as having condemned a system which he laboured with incessant assiduity to establish, on which his hopes of fame were in some measure founded, and which will certainly not defraud him of those honours which are so justly his due.

V. *Remarks*

V. *Remarks on Lichen scaber and some of its Allies.* By the Rev. *Hugh Davies, F.L.S.*

Read Jan. 15, 1811.

ACCURACY and certainty, in the science of Natural History, are attainable but by gradations, and those sometimes minute, and of apparently little importance: any error therefore obviated, or discovery made, however trifling either may seem, may prove a step toward obtaining those ends.

I feel confident that the very respectable names, which I must quote in the following essay, men of science and candour, whose main objects, in their researches, are the ends above stated, will pardon the liberty, which I must necessarily take, in observing a few mistakes with regard to two or three subjects now under consideration.

A late accidental recovery, in Mr. Brewer's own original habitat, near Borth, &c. of his plant, which is described by Dillenius in his *Hist. Musc.* at page 66, *Sp.* 8. "Usnea lanæ nigræ instar saxis adhærens," which is mentioned again at p. 113, and figured in *tab.* xiii. *fig.* 8, has been productive of the following observations, which, perhaps, may not be thought unworthy of the notice of the Linnean Society, as they may assist in ascertaining decisively two or three plants in the said work of Dillenius, and in dispelling a mist which has lately obscured them.

Not

Not a little confusion has prevailed with regard to this plant: Linnæus refers to it, and it only, for his *Lichen lanatus*; Lightfoot does the same; nor does Hudson refer to any other figure. But I am convinced that it is neither Linnæus's nor Hudson's plant: the word "decumbens" in the definition by each author, and "ramulis brevissimis divaricatis" in that of Hudson, seem to confirm my notion, and to point out *f*. 32. of *t*. xvii. of Dillenius, which is the *lanatus* of *English Botany*, 846. Hudson's observation on his *L. pubescens, viz.* "affinis præcedenti (*lanato sc.*) sed minor," confirms me still more strongly in my opinion that *f*. 8. *t*. xiii. is not Hudson's *lanatus*, as *f*. 9. *t*. xiii. which Linnæus refers to for his *pubescens*, and whom Hudson quotes, has evidently no affinity to *f*. 8. *t*. xiii. But let me observe that without doubt this latter is Lightfoot's *L. lanatus*, although he gives us the same definition as Linnæus does. The latter part of Lightfoot's description of it is, I believe, his own, and very accurate; it runs thus, "many short fine capillary fibres, like spinules, grow horizontally out of the sides of the filaments." *Fl. Scot. v.* 2. *p*. 893. This is truly characteristic of Brewer's plant. Professor Acharius, *Lich. Suec. Prodr.* and after him Dr. Smith in *Eng. Bot.* likewise unfortunately quote it for their *L. lanatus*, in conjunction with *f*. 9. *t*. xiii. and *f*. 32. *t*. xvii. whereas the two last, as we presently shall see, are perfectly distinct from the former. The learned authors, now mentioned, moreover introduce the *L. scaber* of Hudson, *i. e.* the *exilis* of Lightfoot, as the same species, which I shall also prove to be very different from the other three, *viz.* from *f*. 8. and *f*. 9. *t*. xiii. and *f*. 32. *t*. xvii.

Now my readers, who have at all attended to these subjects, will perhaps not expect to be told that Mr. Brewer's plant, above quoted, viz. *f*. 8. *t*. xiii. *Dill.* is the very identical *L. bicolor* of the present day. Notwithstanding I was fully confident of my

correctness

correctness in this point, from Dillenius's descriptions of Brewer's plant, at p. 66, "colore nigro et fusco variantem," and again p. 113. under species 32 (differentia) "cum illa nervum medium crassiorem habeat, &c." and the circumstance of my having found Brewer's plant, as above stated; yet, wishing to speak with all possible certainty on the subject, I applied to Dr. Williams, Professor of Botany at Oxford, for what information he might be able to give me concerning the subjects under contemplation. That gentleman, with all readiness, and the most polite attention, supplied me with sufficient instruction, and subjects out of Dillenius's own Herbarium, to preclude every possibility of mistake or doubt. The specimen corresponding with *f.* 8. *t.* xiii. is precisely what I found in Brewer's habitat, *i. e.* LICHEN *bicolor*, which appears in *Eng. Bot. t.* 1853.

This one species being determined, let me now proceed with the other three plants included under the specific name *lanatus*, in *Lich. Suec. Prodr.*, and likewise in *Eng. Bot.*, as above quoted, *viz. f.* 9. *t.* xiii.—*f.* 32. *t.* xvii. Dill. and *L. scaber* of Hudson.

LICHEN *lanatus* of Acharius, and that represented in *Eng. Bot.*, pl. 846, is, without doubt, "Coralloides tenuissimum nigricans, mundi muliebris instar textum." *Dill. p.* 113. *f.* 32. *t.* xvii. The figure is, by mischance, taken from a diminutive specimen; but the descriptions of it by Dillenius, Acharius, and Smith, accord well in the general, and convey an uniform consistent idea: a part of that of Dillenius is as follows; "in latum sparsa, caule crassiore destituta:" again, "hujus ramuli primarii per dichotomiam dividuntur et extrema cornicula, quæ brevissima, bifida plerumque sunt," &c. Acharius's definition p. 216. runs thus, "Caulescens solidus teres læviusculus fusco-niger decumbens cæspitosus, ramis filiformibus implicatis repetito dichotomis."

mis." *English Botany* has this: "Shrubby, filamentous, much branched, intricate, round, solid, smoothish, brownish black, shields of the same colour, flat, with an irregularly toothed margin."

These descriptions are certainly characteristic, with the exception only of the word "caulescens" in the one, and "shrubby" in the other, of the two latter, wherein a confused glance of *L. bicolor* seems to obtrude itself on the true *lanatus*.

Acharius's definition of his *L. lanatus*, when referred to this figure, being, as I have observed, accurate, it is no wonder, when he quotes *f.* 8. *t.* xiii. for the same, that he should say, "Icon minus bona," whereas it is an excellent representation of the plant which it is intended for, *viz. L. bicolor*, if we except indeed one impropriety, I mean its procumbent appearance on the plate, which may tend to mislead, as the plant is invariably upright, as I have seen it in Anglesey and Caernarvonshire, and has a shrub-like appearance.

These two species being, I trust, satisfactorily settled, I will now proceed by observing, that I am enabled to affirm, after an attentive and strict examination of the very plant which Dillenius received from Greenland, and which is marked with his own handwriting as such, that *f.* 9. *t.* xiii. is the very same species with *f.* 32. *t.* xvii. This Linnæus refers to for his *L. pubescens*, and consequently Lightfoot is right in referring to 32. xvii. for that same species. But as we have just now seen that 32. xvii. is the true *L. lanatus*, it will follow that 9. xiii. being the same plant, *L. pubescens*, as a species, proves to be nobody. And so far the above-named authors, Prof. Acharius and Dr. Smith, are right in quoting the two for the same species as Lichen *lanatus*.

Lastly comes *L. scaber* of Hudson to be considered, whose reference

ference to *f.* 9. *t.* xiii. *Dill.* is assuredly wrong; nor is there, I suppose, a figure of it extant. "Fila glabra splendentia," as Dillenius has it, cannot agree with "scabra" in Hudson's definition. Furthermore, concerning this plant, which seems to have escaped the notice of Dillenius, I can speak with all confidence, as Mr. Hudson described it from a plant which I gave him, and which, as far as I can learn, was the only one that had ever been found in fructification, except one other which I at this time have in my possession. Both these specimens I gathered in company with Mr. Hudson, the same morning, in one of our rambles among the Arvonian alps.

Mr. Lightfoot's description of this species, under the name *exilis*, is characteristic, and just, as far as he, not having seen the fructification, could give it.

I cannot take leave of these figures of Dillenius, so often quoted, without observing that, as to Linnæus's reference to *f.* 32. *t.* xvii. as his *varietas γ* of *L. islandicus*, I think there cannot be a doubt of its having been an oversight of the moment, and that he must have meant *fig.* 31, which has a strong affinity to *fig.* 112. *t.* xxviii. *Dill.* which is his *var. β* of the *islandicus*. Indeed his habitat of it, *Sp. Pl.* 1612, "frequens in sterilissimis collibus Sueciæ," (whereas n. 32 is found on rocks only) and the particulars, "ramuli intus cavi, color luridus, basis rubra," &c. in his description, *l. c.*, contribute to confirm fully my conjecture.

On a review of the discussion above, amidst all the confusion which presents itself, of which, I am sorry to observe, still more occurs in Withering's *Arrangement*, under the trivials *lanatus* and *pubescens*, we may deduce the following conclusions.

I. *Fig.* 8. *t.* xiii. Dill., is LICHEN *bicolor* of Gmelin, *Linn. Syst. p.* 1379, who defines it well in these words; "L. ramosissimus erectiusculus teres inarticulatus glaber inanis nitidus infra

 nigricans

nigricans supra sordide albus, ramis patentissimis subulatis." Consequently *L. saxosus* of this author, p. 1378, for which he refers to the above-quoted figure, with a concise vague definition, " L. niger durus," should be omitted. It is likewise *L. bicolor* of Acharius, *Prodr.* p. 215, whose description of it is excellent, and as follows: *L.* caulescens solidiusculus erectus rigidus fruticulosus ater, summitatibus cinereofuscis, ramis fibrillosis diffusis vagis attenuatis." As is also that of Smith, *Eng. Bot.* 1853. " *L. bicolor*, black and grey shrubby Lichen." Spec. Char. Shrubby, solid, erect, rigid, round, black, with numerous, spreading, compound, capillary, tapering branches, whose upper parts are grey." But it is *L. lanatus* of Lightfoot, *Fl. Scot.* p. 892. It is likewise *n.* 1967, *Hall. Helv.* who refers to this figure, as well as to *L. lanatus* of Linnæus: but it is curious to observe how Haller omits the word " decumbens" in Linnæus's definition, to accommodate it to his shrublike plant. The unlucky reference of Linnæus to this figure, for his *L. lanatus*, has propagated an error through a series of almost numberless volumes.

II. *Fig.* 9. *t.* xiii. and *f.* 32. *t.* xvii., as we have proved them to be one and the same species, will be the true Lichen *lanatus* of Linnæus, of Hudson, of Acharius and of Smith. It is indeed the *pubescens* of Lightfoot, 893; but which, as a species, proves, from what has been said, to be a phantom, and vanishes.

III. *Fig.* 31. *t.* xvii. is *var.* γ of Lichen *islandicus* Linn.; but is the *hispidus* of Lightfoot, Gmelin *Syst.*, Smith *Eng. Bot.*, Withering, and Sibthorp, but the *aculeatus* of Acharius, *Prodr.* 213.

IV. And lastly, Lichen *scaber* of Hudson, *Fl. Ang.* 562, which is the *exilis* of Lightfoot, and has been erroneously quoted for, or as a variety of *L. lanatus*, stands firmly as a distinct and well defined species, under the following definitions; " *L.* (*exilis*) filamentosus ramosissimus cæspitosus, filamentis capillaceis implexis

plexis opacis scabris." Lightf. *Fl. Scot.* 894.—" *L.* (*scaber*) filamentosus ramosissimus decumbens implexus scaber, scutellis concavis integerrimis." Huds. *Fl. Angl.* 562.

At last, I cannot conclude without expressing my suspicion of the accuracy of some of the synonyms quoted by Dillenius for Species 8. *p.* 66. *f.* 8. *t.* xiii. *v. g. Syn. St. Br. p.* 65. *n.* 3. " Muscus *coralloides* lanæ nigræ instar saxis adhærens." D. Stevens.—" Præcedenti (*L. chalybeiformi sc.*) ramosior et majus expansus, minus vero rigidus." This short comparative description, as well as Dillenius's own definition, " *Usnea* lanæ nigræ instar saxis adhærens," and his description, " biunciali et triunciali nostra specimina longitudine sunt, filamentis ubique teretibus, magis atris et magis confertis, quoquoversus sparsis et invicem implexis," &c. convey a much juster idea of a full sized specimen of *f.* 32. *t.* xvii. than of Mr. Brewer's plant; particularly to such as have seen both plants in a growing state; and seem to intimate that even the great Dillenius himself laboured under some degree of illusion in this instance. But *f.* 8. *t.* xiii. is a good representation; and that part of Mr. Stevens's definition above quoted, " Muscus *coralloides* lanæ &c., is likewise characteristic of Mr. Brewer's plant, which is there introduced, that is Lichen *bicolor*.

H. D.

VI. *Strepsi-*

VI. *Strepsiptera, a new Order of Insects proposed; and the Characters of the Order, with those of its Genera, laid down.* By the *Rev. William Kirby, F.L.S.*

Read March 19, 1811.

WHEN we consider the vast number of non-descript species, with which, since Linné gave the last finish to his System of Entomology, the European cabinets of insects have been inundated, it seems remarkable that few or none have hitherto been discovered which will not arrange under some one or other of his orders: for although Olivier, and after him Latreille and the best modern entomologists, following the illustrious Baron De Geer*, have very properly made a distinct order of such of the Linnean *Hemipterous* genera, as instead of a rostrum are furnished with the instruments of mastication, namely, the old genera *Blatta, Mantis* and *Gryllus*†; yet this change was not so much the consequence

* De Geer was the first who separated the insects to which I allude from the rest of the *Hemiptera*, and he gave them the name of *Dermaptera*, a name not improper, and which in justice to him should have been retained. They are the *Orthoptera* of Olivier &c. and constitute the seventh class of the second order of De Geer's first general class. See *Mem. tom.* vii. *tableau general* facing *p.* 862. *Recapitulation de l'Arrangement, &c. ibid. p.* 759. and also *tom.* iii. *Mem.* 9. *p.* 399.

† The genus *Forficula* Linn. is also by the above authors arranged with the *Orthoptera*, and

sequence of an influx of new insects, as of a more correct appreciation of the characters of those that were already known*. Rossi therefore may be deemed peculiarly fortunate in being the first discoverer of a singular tribe of insects which indubitably belongs to a new order, since it will arrange, whether we consider its metamorphosis or characters, under none of those at present established.

and it must be allowed that both its metamorphosis and the peculiar structure of its maxillæ (Fabr.) entitle it to a place in that order. The substance of its elytra, however, and its wings folded transversely as well as longitudinally, give it some claim likewise to a station amongst the *Coleoptera*. I am not sure that it will not be adviseable, since, not to name the peculiar anal forceps, its wings in their structure, figure and veins, (a circumstance of no small importance in ascertaining orders as well as genera) are quite unique and *sui generis*, to consider these insects, which Mr. Leach also once suggested to me, as forming an intermediate order between *Coleoptera* and *Orthoptera*. If entomologists should judge this hint worthy of attention, I would further suggest that De Geer's name above mentioned (*Dermaptera*), which is not at all inapplicable, should be given to it.

* This principle of improvement with respect to orders might, I think, be carried still further, and applied to another of Linné's Genera, *Phryganea*, which is evidently not in its proper place, being more nearly allied to the *Lepidoptera* than to the *Neuroptera*, as both Reaumur and De Geer have long ago observed (*Reaum. tom.* iii. *Mem.* 5. *p.* 176 *&c.* and *De Geer tom.* ii. *partie* 1. *Mem.* 7. *p.* 497. and *tom.* vii. *p.* 715 *&c.*) Although some other insects (*Myrmeleon* and *Hemerobius*) placed in the *Neuroptera* do not agree with the rest in their metamorphosis, yet in their perfect state they exhibit the principal characters of the order, and therefore are properly retained in it; but *Phryganea* differs from the rest both in metamorphosis and characters. Its metamorphosis is very peculiar, the larva imitating many of the *Tineæ* in constructing of various materials a kind of case for its habitation, from which circumstance they are commonly called *Case-worms*; and the pupa, which is *incomplete*, and at first quiescent, just before its final change, by a wonderful provision of an allwise Creator, becomes locomotive that it may place itself in a situation of security out of the water before it casts off its exuviæ; and for this purpose the antennæ and the four anterior legs are not confined under the general envelope, though each has its peculiar integument, so that the animal can use them when the time comes for it to emerge from the water and commence a denizen of the air. For further particulars I must refer the reader to the Memoir of De Geer above quoted, where he will meet with much interesting matter. The imago exhibits few or none of the characters of the other *Neuropterous*

established. The insect appertaining to this tribe which he discovered, he has described under the name of *Xenos Vesparum**; but he seems himself to have entertained no suspicion of its not belonging to any of the present orders, since without hesitation or remark he assigns it a place next to *Ichneumon*†. When I first called the attention of entomologists to a British insect of

Neuropterous genera. The wings are veined in a peculiar manner, without reticulations, in some degree like those of *Lepidoptera*. The antennæ resemble much those of the *Tinea* tribe, and the tibiæ of many of them are armed with the two pair of spurs observable in so many of the Moths; but they have no spiral tongue, the wings though hairy have no scales, the under wings are folded longitudinally, and the head, besides the usual compound eyes, has three stemmata. If these remarks appear to entomologists well founded, and it be thought right to consider *Phryganea* as constituting a new order, I think it might be distinguished, since the wings of all the known species are hairy, by the name of *Trichoptera*.

It will appear, I fear, an unreasonable addition to this already long note, but I cannot help further observing upon this subject, that the student in entomology labours under peculiar disadvantages to which the botanist is a stranger, from the small number of orders into which the class of insects is divided. These animals, I imagine, fall not far short of plants in number of species, and yet we have only eight orders under which to arrange them; whereas the botanist has twenty-four classes divided into innumerable orders, which shortens his labour wonderfully. This is a powerful plea for the adoption of new orders, where nature leads the way; and I think if each order were divided into denominate sections (by which I mean sections that have a name) it would be a great improvement, and very much facilitate the study of this science. M. Latreille has led the way here, and done much for us, but, as is often the case with new inventions, his system is not sufficiently simple for general use: his names, likewise, have not that harmony and uniformity of termination which is necessary to make them easily retained by the memory. If we adopted a patronymic appellation for these sections, for instance, Coleoptera *Scarabæidæ*, Coleoptera *Staphylinidæ*, Coleoptera *Sphæridiadæ*, Orthoptera *Gryllidæ*, &c. it would be liable to no objection of this kind: and the subsections, rather than the primary ones, might be founded upon the number of the joints of the tarsi, and those genera that are nearly related, for instance *Aleochara* Gravenh. and *Pselaphus* Fab. might be kept together, instead of being placed widely asunder, as they are upon the present system.

* *Fn. Etrusc. Mantiss. Append. p.* 114.

† *Insectum novi generis Ichneumoni proximum*, ibid.

this

this tribe, at which time, and till very lately, I was unacquainted with this discovery of Rossi's, I observed that it was doubtful to what order it ought to be referred*, though I was unwilling at that time to speak too positively on the subject. The opinion to which I then inclined has lately received full confirmation from one of the most experienced and able entomologists of the present day, M. Latreille, who thus, in one of his last works, expresses himself upon this subject: "*Insectum prorsus singulare* (Stylops Melittæ *Dom. Kirby*) *a Dom. Brebisson accepi. Systemata entomologica perturbare videtur, cum ex omnibus ordinibus repellatur.* Xenos Vesparum *Rossi animal præcedenti affine et animum pariter excrucians. Tempus ducamus et dies alteri lucem afferrent*†." The time he predicts in the latter part of this paragraph seems now arrived; for, if any shadow of doubt or hesitation remained in my mind, it has been dispelled by my valuable friend and correspondent the learned and ingenious Professor of Natural History in Harward University, Cambridge, New England, William Dandridge Peck, Esq.‡ who has sent me specimens of an insect of this tribe still more singular and wonderful in its structure than my *Stylops Melittæ*, and which appears to be of the same genus with Rossi's *Xenos Vesparum*, although, as far as I can judge from his description, a distinct species: this he has accompanied by elegant drawings both of the larva and perfect insect, and such observations as he had an opportunity of making; from which, I think, it will clearly appear, every circumstance being taken into

* *Monogr. Ap. Angl. vol.* ii. *p.* 112.

† *Genera Crustac. et Insect. tom.* iv. *p. ult.*

‡ This gentleman has published an admirable little tract, in which he gives, in the manner of Reaumur and De Geer, the history of a *Tenthredo* that infests the cherry-trees in New England; which shows that, had he leisure to devote himself more to Entomology, he would enrich that science with invaluable treasures. This little work is entitled *The Natural History of the Slug-worm.* Boston, 1799, pp. 14.

 consideration,

consideration, that these insects cannot with propriety be referred to any existing order. To make this evident to the satisfaction of entomologists, I shall begin by stating these observations, as nearly as possible, in Professor Peck's own words, and next endeavour to point out those peculiarities which, in their different states, distinguish them from those of every other order, and establish their claim to be placed in one by themselves.

Professor Peck's letter is dated September 21st, 1809; but, from some unknown cause, I did not receive it till nearly a year after its date. He thus introduces the subject before us:

"The study of insects would be delightful to me, if my other employments would permit me to pursue it steadily. The contemplation of their infinite variety of forms, and the unspeakably wonderful contrivance of their mechanism, irresistibly attract attention; but the great object is to know, as far as possible, for what use these living machines were made, the metamorphoses they pass through, and the means they instinctively use for the preservation of their race. When we know these, our curiosity is gratified, our admiration increased, and we feel and exclaim, '*Eminet in minimis maximus ipse Deus.*'

"One of the most curious of all insects is your *Stylops*; and I heartily wish you may be able to find more specimens. Your having met with the remains of *Stylops* in foreign *Vespæ** made me determine to look for it in those of this country, and I have had the pleasure to find it in a species that is here the most abundant†. The abdomen of the *Vespæ* is so distorted by the *Stylops* that I have no difficulty in knowing them when on the wing. Taking them with the gauze forceps, bringing them into

* *Sowerby's British Miscellany*, no. ix. *p*. 94.

† *Vespa fuscata. Fabr. Ent. Syst. Em.* ii. 260. 27. *Polistes fuscata. Syst. Piez*. 270. 4. Tab. VIII. *fig*. 6.

a close

a close room, and permitting them to fly to the windows, I caught them again with a wine-glass and a card, fed them with sugar, and thus preserved them till their parasites were disclosed. I had not the pleasure to see them emerge, but found them soon after. I obtained four in this way, and brought several nests of the *Vespa* into the house, taking them in the night when all the inhabitants were at home, in the hope of obtaining more; but I got no living ones. This year I have not taken one, for want of time to attend to it.

"All I know of this *Stylops* was picked up in a few days that I passed at my little place at Newbury, about forty miles from this. The form of the larva will be seen at fig. 1. and fig. 3. In the feeding state the head is near the base of the abdomen of the wasp, as I found by dissection. When the feeding state is passed, it is easy to conceive that it turns, and with its flattened head separates the membrane which connects the abdominal scuta, and protrudes itself a little way, accurately closing the aperture, which is but just large enough to admit it. All this time the wasp is active, and associates with its companions. When just protruded the head of the larva is of a pale brownish colour; by degrees it assumes a rounder form, and becomes almost black.

"The chrysalis state ensues; but I suspect that only the part exposed to the air, and that immediately under the pressure of the abdominal ring, becomes hard.

"My four *Stylopes*, I concluded at the time of sketching the figures, were males; they were all alike. The last segment of the abdomen in the male of the larger *Cicadæ* is joined to the penultimate one somewhat as in this; but in *Cicada* it is only a kind of operculum. In the *Stylops* the last portion of the abdomen appears to be an organ of importance in its œconomy: it

 terminates

terminates in an acute point, which stands at right angles nearly with its longer part or shaft*: but without seeing the other sex I cannot determine what it is. Is it a kind of aculeus for depositing its eggs in the larva *Vespa*†? for it is in the larva that the eggs are probably deposited‡.—The *Stylops* of the wasp has no mouth that I could find; there is indeed a depression a little anterior to the maxillæ§ (*Mandibulæ* in Fabrician dialect), but it is transverse! It therefore probably does not feed in the perfect state, like some *Phalænæ*, and only continues the species. There is one particular in its manners which tends to strengthen this opinion. I have noticed in many *Phalænæ elingues*, and indeed in some others, but especially in those, that, whenever they alight, their wings are continually in a tremulous motion, particularly in the males, whether the insect is running briskly or standing still. These, be assured, are the tremblings of eager desire. So my *Stylops*, which I confined under a watch-crystal, coursed round its prison with surprising trepidation as long as it lived, which was but a few hours. This insect is so exceedingly uncommon in its structure, that I know not in what class *(order)* to place it, till I have seen both sexes, and examined more insects than I have yet been able to do.—'*Mihi contuenti*,' says Pliny, '*persuasit res ipsa naturæ, incredibile nihil existimare de eâ.*" What can be

* *See* Tab. VIII. *fig.* 14. Tab. IX. *fig.* 14. 15.

† From this organ, which seems rather an oviduct, I apprehend Professor Peck's specimens were females.

‡ Reasoning from analogy, it seems not probable, though I formerly inclined to this opinion, that the egg should be laid in the wasp in its first state, and the *larva* feed on it in its last. Rossi, however, was of this opinion; for, speaking of his *Xenos Vesparum*, he says, "*Cui vespæ larva antequam cellulæ clauderentur forte incunabula dedisse videtur.*"

§ Mr. Spence and myself, in compliance with the custom universally adopted abroad, though we are of opinion that the terms should rather be reversed, in order to prevent the confusion which must arise from employing different words in different countries to denote the same parts, have agreed to use *Mandibula* and *Maxilla* in the Fabrician sense.

be said to this insect? The more I consider it, the more I wonder it is so very extraordinary. What can be the use of the mandibulæ, for such they certainly are? They are not strong enough to cut its way through the paper cells of the wasp's comb; can they be useful in opening the sides of the larva for depositing the eggs?"

Thus far my ingenious correspondent: I shall now notice the particulars which Rossi has detailed as observable in the species he discovered, *Xenos Vesparum*, which although parasitic in the same tribe of insects, as far as I can judge from his figure* and description, appears to be a distinct species from Professor Peck's, if indeed it belong to the same genus.

It inhabits, he says, *Vespa gallica*, in which it is frequently found; and *V. sexfasciata*, with some other more minute species, are also infested by a similar foe, but whether the same he had no opportunity to ascertain. The individuals inhabited by the *Xenos*, he observes, are readily known by the unnatural swelling of the fourth segment of the abdomen, from which the insect in its pupa state usually emerges, sometimes one, often two, and now and then even three in the same wasp. The imago or perfect insect generally comes forth in August and September; and if about that time the pupa be extracted with a needle from the abdomen of the wasp, and its covering being broken, if it be carefully stripped of its white tunic, living specimens may be obtained. Perhaps the egg of this animal is laid in the larva of the wasp before its cell is closed. It is wonderful that the *Vespæ*, after supporting one or more of these insects, should survive; yet they are often met with having only the

* *Fn. Etrusc. Mantiss. tab.* vii. *fig.* B. *b.* This figure is a very indifferent one, and conveys no clear idea of the insect, at least, if, as seems most probable, it be congenerous with *Xenos Peckii.*

exuviæ

exuviæ of the *Xenos* remaining in them, and are nevertheless sufficiently active. Perhaps the time this insect remains in the larva state is very short, and the thorax of the wasp not being attacked by it, may be the reason why it escapes with life.

Having given the above abstract of the observations of Professor Peck and Rossi on this tribe of insects, I shall now assign, more in detail, the reasons which have induced me to consider the genera of which it is composed as belonging to a new order, beginning with their preparatory states; for, if we would ascertain this point legitimately with respect to any description of insects, a due share of attention and weight ought to be allowed to the metamorphosis; for although I would not, with Swammerdam, Lyonet, and Bonnet, build a system solely on this foundation, (since this, in some cases, would unite in the same order insects that are widely different in their perfect state, and separate those that are nearly related*,) at the same time, taken in conjunction with the characters of the perfect insect, it is often of great use in ascertaining the order to which any genus belongs. In having recourse to it certain rules, for the proper application of it, should be laid down and adhered to: I will venture to lay before the Linnean Society some that appear to me open to little or no objection.

Rule I. *When an insect, in its perfect state, combines the characters of two or more orders, (unless it be deemed adviseable to place it in an order by itself,) it should arrange with those whose metamorphosis is the same.*

Example.—Forficula exhibits the characters both of *Coleoptera*

* *Coleoptera, Hymenoptera,* some *Neuroptera* and *Diptera* agree in their metamorphosis, and again *Culex, Tipula* Linn. &c. are widely separated in this respect from those of that order whose metamorphosis is *coarctate.*

and

and *Orthoptera*; but its metamorphosis being that of the latter, unless placed in a new order, its station should be in it.

Rule II. *When an insect possesses the characters of one order and the metamorphosis of another, in this case it should follow the characters.*

Example.—Myrmeleon and *Hemerobius* clearly exhibit the characters of *Neuroptera*; yet their metamorphosis is that of *Coleoptera*, *Hymenoptera*, and many *Diptera*, except that their pupa (as is also the case with *Hydrophilus*) is inclosed in a cocoon spun by the anus of the larva.

On this rule we may observe that, since the perfect state is the grand consummation of the insect to which all its other states are subordinate and subserve, this state therefore ought to be the principal regulator of its station.

Rule III. *Where an insect exhibits the metamorphosis of an order, or of a section of it, but none of its characters, nor those of any other order, it should not on that account be arranged in such order, but on the contrary form a distinct one.*

Example.—The metamorphosis of *Coleoptera*, *Hymenoptera*, and many *Diptera* is *incomplete*, yet on account of the characters of the imago they are properly placed in different orders. This rule also applies to *Stylops* and *Xenos*.

Rule IV. *Where the genera which compose an order have invariably one kind of metamorphosis, no insects that vary from it in that circumstance should be placed in it, unless they exhibit a perfect agreement with it in characters.*

Example.—In the *Coleoptera* and *Hymenoptera* the metamorphosis is invariably *incomplete*, and therefore *Forficula*, whose metamorphosis is *semicomplete*, and *Stylops* and *Xenos*, whose metamorphosis comes nearest to *coarctate*, since they differ in several characters from the perfect insects of those orders, should not

arrange

arrange with them; while *Myrmeleon* and *Hemerobius*, though they differ from the general metamorphosis of the *Neuroptera* order, should nevertheless be arranged in it, since they agree with it in characters.

Upon comparing together Professor Peck's account and figures of the larva of *Xenos Peckii* (for so I call his insect) I at first imagined that it was of that order of larvæ, which, having a membranaceous or rather fleshy head, can lengthen or shorten it at pleasure, like the larvæ of many of the *Muscidæ;* for, if (TAB. VIII.) fig. 3. be compared with fig. 4, the head in the latter seems proportionally longer than in the former: but yet, as fig. 4. is more highly magnified than fig. 3, perhaps this appearance may be merely the result of that circumstance and of a lateral view. Some doubt, however, must remain with respect to this point; and should my first suspicion be confirmed, it would show a considerable affinity between the larvæ we are speaking of, and those of many of the *Diptera* whose metamorphosis is *coarctate.* Professor Peck further observes, which throws some additional weight into this scale, that the head of the larva, previous to its assumption of the pupa, takes a rounder form. There are, however, no traces in either figure, of the unguiform mandibles with which larvæ of this description are usually armed, nor any appearance of the anterior and posterior spiracles (the latter in two plates in two anal cavities) which commonly distinguish them: so that, did I know only the larva, I might perhaps be inclined to conjecture that the metamorphosis of these insects is *incomplete;* for I can discover no conclusive characters in the larva itself, as far as I can get an idea of it from Professor Peck's figures and observations, to ascertain satisfactorily the kind of its metamorphosis: but with respect to the pupa the case is different; for since I have examined *Stylops Melittæ* in this state, I can

can here speak with more confidence. These pupæ exhibit no trace either of wings, antennæ, palpi, or legs*, under their envelope, so that they appear to come nearest to the *coarctate* metamorphosis, but with this difference, that the head-case is distinct from that which covers the rest of the body. In this kind of metamorphosis also the skin of the larva usually hardens and forms a cocoon, in which the parts of the future imago are developed; but whether, in the order of insects we are considering, the pupa rejects or retains the skin of the larva, is not clear. From Rossi's observations it should seem that the insect is enveloped by a double integument†, the exterior of which may be analogous to the cocoon formed by the skin of the larva, and the interior to the membrane in which even a *coarctate* pupil is inclosed: that part of the body, however, which remains inserted in the body of the *Melitta* or *Vespa* is soft and fleshy, while the head and neck, being exposed to the air, become hard and corneous. One peculiarity observable in the pupa of Professor Peck's species would seem to imply that it does reject the skin of the larva, at least as far as the head is concerned, for the eye-covers (a part, to the best of my recollection, peculiar to this insect,) are set with pellucid hexagons‡; which looks as if they were intended by the all-wise Author of nature to transmit some light to the insect when in the pupa state: it is evident by an inspection of Professor Peck's figures 3 and 4, that the larva has nothing of this kind; therefore the skin, at least of the head, must be cast.

* TAB. IX. *fig.* 17. This figure was taken from a specimen, the only one I could procure, that had been long extracted from the body of a *Melitta*.

† *Hæ pupæ, si acûs ope e loco penitus extrahantur, abruptoque tegumento leniter deinde tunicâ seu veste albâ propriâ exuantur.* Rossi.

‡ TAB. VIII. *fig.* 7.

The metamorphosis then of these insects, though, in an improper sense, it may be denominated *coarctate*, is, strictly speaking, different from that of every other known order, and something intermediate between *incomplete* and *coarctate*. Even from this view of the subject it appears, I think, with no slight degree of evidence, that their claim to stand by themselves as a distinct order is very strong.

But this will be demonstrated more satisfactorily when we consider the many extraordinary and unique characters exhibited by these insects in their perfect state. I shall first call the attention of the entomologist to those organs from which, in the Linnean system, the characters and denominations of the orders are chiefly taken; I mean the elytra and the wings.

The three first orders only are distinguished by elytra or hemelytra; there is no necessity, therefore, to compare our insects in this respect with any other; and since all the true *Hemiptera* take their food by suction by means of an oral or pectoral rostrum, which forms one essential diagnostic of the order, these also may be put out of the question, the *Stylops* tribe having mandibles and palpi and no rostrum.

The elytra of the insects in question, as to their substance, agree certainly with those of many *Coleoptera*, being soft, flexile, and coriaceous, as is the case with *Cantharis* and others*: but in situation, direction, and connection they differ from every *Coleopterous* and *Orthopterous* genus. With respect to situation, they are placed very near the head of the insect, not on the back, but, which is a circumstance most singular and without parallel in the entomological world, apparently attached to the coxæ of

* Viz. The *Malocodermi Latr. Gen. Crust. et Ins.* i. *Insecta Pterodicera Ord.* i. *Fam.* v. *p.* 252—268.

the

the anterior pair of legs*: whereas in *Coleoptera* and *Orthoptera* their point of attachment to the trunk is dorsal, by means of an apophysis or kind of pivot, which acts under the posterior part of the thoracic shield; and they cover the back; the wings, where they exist, for the most part entirely, though in some few genera only partially†; and the abdomen. In connection also and direction they are quite unique, there being nothing at all similar to them in any order; for they are entirely and widely separated from each other, coming in contact in no one part, at first receding from the body, then curving towards it, and lastly diverging from it again‡, so as to give them the appearance of distortion. In *Coleoptera* it is well known, with the exception of *Melöe* Fabr. (the elytra of which diverge from each other considerably, though at the base one laps over the other) that, when closed, they unite together at the longitudinal suture§. In all the *Orthopterous* genera one elytrum laps more or less over the other‖; in a few species of *Phasma* and in *Acrydium* the elytra are very minute, and may perhaps be deemed more analogous to those of *Stylops* and *Xenos*; still, even in these cases, when closed they cover the base of the wings, are dorsal, and remote from the head. The elytra, therefore, now under consideration, whether we advert to their situation, direction, or connection, cannot be regarded as indicating the arrangement of these insects under any of the present orders.

* TAB. IX. *fig.* 2. This discovery I owe to the accurate eye of Fr. Bauer, Esq. of Kew Green, who has been kind enough to enrich this paper with such a drawing as I believe has scarcely a parallel in Entomology.

† *Molorchus*, for instance, *Necydalis*, *Atractocerus* Latr. *Malthinus* Latr. and *Phasma*.

‡ TAB. VIII. *fig.* 15. d d.

§ They diverge from each other also in some other genera, *Necydalis* for instance, though not so much as they do in *Melöe*.

‖ *Forficula* in this respect appears to agree with the *Orthoptera*.

The wings next claim our attention: these have nothing in common with the *anelytrous* orders, differing from them in figure, substance, and in veins*: therefore the *Stylopidæ* cannot belong to the *Hymenoptera*, amongst which Rossi has placed them,

* The veining of the wings, under certain restrictions, has been assumed as affording fundamental characters of an arrangement of the *Hymenoptera* and *Diptera* orders, (which he gives as a new idea,) by the ingenious and learned Professor Jurine, of Geneva, in a work recently published entitled "*Nouvelle Méthode de classer les Hyménoptères et les Diptères.*" This excellent author, when he says "*Aucun auteur, à ce que je crois, n'a examiné avec assez d'attention ces parties pour y trouver les bases d'une méthode qu'on pût leur appliquer,*" (*Introduct.* p. 2.) seems not to be aware that a British Entomologist was the real inventor of such a system. But it is but justice to claim for our countryman the honour to which he is entitled; and I do this without the smallest wish to derogate from the merits of Professor Jurine, who in the work just alluded to has proved himself one of the first Entomologists of the age. The following are Harris's own words: "I have kept close to the outlines of the system of Linnæus, so far as his method was agreeable to, and did not interfere with, the plan which I have adopted, of a strict adherence to a *natural system,* separating the classes by such nice though strong distinctions, that the observer at first sight of an insect (if it be of the *Diptera* or *Hymenoptera*) shall be capable of not only knowing the class that it refers to, but at the same time to what *order* and *section* of that class, and this by the *wings* only.

"It is to the *tendons* of the *wings* that I am beholden for the discovery of the numerous species (particularly of the *Musca*) contained in this work; for, having collected on a certain time a great number, I wanted to separate the species, and take away the duplicates, but knew not where to begin for want of some plan or method to proceed upon, and such a one as would effectually prevent the taking a male and a female of one kind for two distinct species. I at length perceived, by the different disposition of the *tendons*, that there were a certain number of *orders* or sorts of *wings*, and immediately proceeded to divide them respectively. Thus the difficulty was unravelled; for it was now but a pleasing task to select the various species of each order, male and female, and place them together. It was therefore a prevailing circumstance with me to insert drawings of the *wings* according to their various *orders*, that whoever may intend to collect the *Diptera* and *Hymenoptera* for the future, may have the opportunity of the same benefit and assistance from them which I have experienced."—*Harris's Exposition of English Insects, Introduct.* p. i. ii.

Harris was evidently illiterate, and therefore could not give that form to his ideas that a man of better education would have done; but he was an attentive observer of nature, and as such is entitled to the merit of his own discoveries.

them, led doubtless by the single circumstance of the larvæ being parasites in a living insect. But this is certainly not a sufficient reason for placing them in this order, since *Musca larvarum* and other *Diptera*, whose larvæ also inhabit living insects, might on the same account be placed in it. The wings should be considered as to their situation, substance, figure, folding and veins. With respect to the first, situation, they are inserted at a much greater distance from the point of attachment of the elytra than takes place in any of the other elytrophorous insects: in substance they are very similar to those of many of the *Hemiptera*, a little thicker than in *Coleoptera* and *Orthoptera*, where the wings are pure membrane. In shape the wings approach to those of *Orthoptera*, being, as nearly as may be, a quadrant of a circle*: in this respect they differ considerably from *Coleoptera*, the wings in this last order being usually semicordate or semiovate. They fold longitudinally, in which circumstance they likewise agree with *Orthoptera*. In *Coleoptera* there is commonly an oblique fold at the base, where a portion of the inner part of the wing laps underneath, and a transverse fold in the middle or near the apex†. The veining of the wings is very simple; a few longitudinal diverging nerves constitute the whole apparatus necessary to keep these ample wings sufficiently extended for the insect's purposes; in this they somewhat resemble the coleopterous genera *Hister*, *Necrophorus*, and the *Staphylinidæ*, (though in these the veining is rather more complex,) but are quite different from the *Orthoptera*, the wings of all the genera in that order, when *Forficula* is excluded, having numerous longitudinal veins crossed

* TAB. VIII. *fig.* 15. gg.

† This takes place even in *Molorchus*, whose wings are very little covered by the elytra; but in some *Buprestides* (*B. vittata*) the transverse fold seems not to take place. See also *De Geer*, *tom.* iv. *p.* 125.

alternately

alternately at right angles by an infinity of transverse ones, so that their reticulations, or little squares, are usually arranged like bricks in a wall: in *Forficula*, indeed, the nerves are chiefly longitudinal, but they are all connected near the margin by a transverse one which surrounds three-fourths of the wing.

From the peculiarities here stated, I trust I have made it evident, as far as the elytra or the wings are concerned, that these insects will not arrange under any of the present orders.

I shall now say something on the remaining characters of the *Stylopidæ*, beginning with what Mr. Spence and myself, in our proposed elementary work, have denominated *Trophi* (Feeders)*. Upon these the Fabrician orders are professedly founded, and therefore this will enable us to judge whether our insects will arrange under any of them. The whole of the orders established by that system may be divided into two principal classes; those that masticate their food, or at least have mandibulæ and maxillæ, and those that imbibe it by suction; in the first we have *Eleutherata*, *Ulonata*, *Synistata*, *Piezata*, *Odonata*, *Mitosata*, *Unogata*, and all the *Crustacea*. The characters of this class are all taken from the maxilla or under-jaw: under the second, the suckers, are arranged the *Glossata*, *Ryngota*, and *Antliata*; the characters of these are taken from the tongue or haustellum, which is another name for it. Now in the insects in question, the *Stylopidæ*, neither maxillæ nor tongue are discoverable; they are armed indeed with what, as well as Professor Peck, I am disposed to consider as mandibulæ or upper-jaws, but which are not formed for mastication; these mandibulæ, unlike all others, are fixed in the head on its under-side, between the palpi at their base†, a

* Fabricius names the parts in question *Instrumenta cibaria*; but having laid it down as a rule not to employ compound terms, where it was possible to avoid it, except to express qualities, we have substituted the above for those of Fabricius.

† Tab. VIII. *fig.* 9. a.

circumstance

circumstance which induced me formerly to consider them as analogous to the labial palpi of Latreille: these palpi, which are biarticulate and very conspicuous, appear to be inserted in the head itself just exterior to the mandibulæ. In my specimens, which are in an imperfect state, I have not been able to detect any mouth or lips, though there is something like an upper lip in *Stylops Melittæ*; and Professor Peck could see nothing but a depression under the head*, though he had the advantage of recent specimens. So that the catalogue of the parts of the mouth is short indeed; mandibulæ only, and what may be regarded as analogous to maxillary palpi; and these situated, both with relation to each other and to the usual place of the same organs in other insects, in a manner perfectly unique and peculiar. This tribe, therefore, seems to be intermediate between the two grand classes above alluded to, the masticators and suckers, and to belong to neither; and therefore cannot be arranged in any of the Fabrician orders.

I shall now advert to such of their remaining characters as are most peculiar and remarkable. Their antennæ in this respect first catch our attention, which after two or three common joints divide into two branches nearly equal in length, thus giving the insect a very unusual appearance†: but this circumstance, singular as it is, is not altogether peculiar to this tribe; many both coleopterous and hymenopterous insects have branching antennæ; their branches, indeed, are commonly lateral processes issuing from a main stem, but in *Tenthredo furcatus*‡ they are equal branches; in *Gyrinus* the antennæ also are bipar-

* Tab. VIII. *fig.* 9. c.

† Tab. IX. *fig.* 10. b. c. *fig.* 11. 12. *Kirby Monogr. Ap. Angl. tom.* i. *tab.* 14. *no.* 11. *fig.* 3. 4. *Sowerby's Brit. Miscell. no.* 9. *plate* 45. *fig.* 5. a a. b b.

‡ *Coquebert Illustr. Ic. Dec.* I. *tab.* iii. *fig.* 4.

tite,

tite, only one lobe is shorter than the other and differently shaped, yet both spring from a common joint embedded in the head*. The most striking peculiarity, however, exhibited by our *Stylopidæ* are their eyes, not so much on account of their being placed on a pillar or foot-stalk, a character they possess in common with several other insects†, but from the unusual circumstance of their having the hexagonal lenses of which they are composed separated from each other by a septum or partition, which being elevated above the lenses gives the eyes a cellular surface, so that under a good magnifier they have somewhat the appearance of diamonds set in jet or ebony‡: these lenses are also very much larger and infinitely less numerous, especially in *Xenos*, than they are in other insects that have compound eyes. The eyes of these insects, therefore, are of a very unique description, differing from all other compound eyes in having these septa, yet not the same as the aggregate eyes that distinguish some apterous genera§, which are merely a number of simple hemisphærical eyes, like those of spiders, collected together, and not hexagonal lenses as in the insects in question. I shall next notice a circumstance which at once distinguishes them from all *Coleoptera* and *Orthoptera*, and gives them some affinity with *Hymenoptera*, I mean a narrow collar|| instead of an ample thoracic shield: the piece, however, which follows this¶ is quite unlike the part analogous to it in *Hymenoptera*, in which order it is usually taken, but improperly, for the thorax, since it does not answer, as the

* Tab. IX. *fig.* 13.

† Many of the *Crustacea*. Many male *Ephemeræ*, which besides the common compound eyes and stemmata have also columnar ones, and several *Cimicidæ*. See *De Geer, tom.* iii. *p.* 338. 343. *plate* 34. *fig.* 17. 18. 24. 25.

‡ Tab. IX. *fig.* 10. d d.

§ *Oniscus* Latr. *Iulas,* and *Scolopendra.*

|| Tab. VIII. *fig.* 15. b.

¶ *Ibid.* c.

best

best entomologists have observed, to the thorax in *Coleoptera.* This piece Mr. Spence and myself have agreed to name *Dorsolum* (dorslet); it exists in all the insects of that order, only it is covered by the thorax, and is that part to which the base of the scutellum is united*: next follows what answers to this latter part in other insects†, in form not very unlike the scutellum of *Coleoptera*, but situated so near the head, that at first no one would take it for that part. That this is the scutellum is evident from its situation between the elytra and the wings, and from its being the third piece of the back of the trunk: this piece is commonly followed by another narrow one, which we have called *Postscutellum*‡; but this is obsolete in this tribe. The piece which next succeeds§ constitutes the principal and most conspicuous part of the back of the trunk, but in other insects forms only its declivity towards the abdomen||; we denominate the whole *Lumbale*; it consists of the *Lumbi*¶ and *Interlumbium***; next follows what we have named *Postlumbium*††: the scutelliform process which succeeds this‡‡ seems quite unique and peculiar to these insects; it is what I formerly mistook for the scutellum§§, but it is certainly not analogous to that part. The postlumbium in *Coleoptera* and many other insects is followed and the trunk terminated by a cleft process that separates the upper part of the cavity of the trunk from that of the abdomen, which from its figure we have denominated *Nates*||||: but this piece being covered by the first segment of the abdomen, can scarcely be deemed analogous to the process which, in the *Stylopidæ*, terminates the trunk and covers the abdomen. I shall call this ano-

* TAB. IX. *fig.* 16. a.
† *fig.* 1. e.
‡ *fig.* 16. c.
§ *fig.* 1. ffh.
|| *fig.* 16. dde.
¶ *fig.* 1. ff. and *fig.* 16. dd.
** *fig.* 1. h. and 16. e.
†† *fig.* 1. i. and *fig.* 16. f.
‡‡ *fig.* 1. 2. k.
§§ *Mon. Ap. Ang. tom.* ii. *p.* 113.
|||| TAB. IX. *fig.* 16. g.

malous part the *Proscutellum.* The different pieces which compose the underside of the trunk exhibit no very peculiar characters except those remarkable processes which, projecting out on each side from under the body, form, in conjunction with the proscutellum, a kind of rampart to enclose and protect the base of the abdomen; and within which, at least in the case of *Stylops Melittæ*, it appears to be retractile. These processes* are equivalent to what we denominate *Femoralia* in many insects, but they are unlike those of any I ever met with. In the legs there is this remarkable, that the trochanters†, especially in the four anterior legs, are much larger than the coxæ‡, in which the latter are not easily detected. The tarsi, which have only four joints, are distinguishable from those of most other insects from their being without claws; for what Mr. Sowerby and I, in *Stylops Melittæ*, mistook for claws§ was merely the bifid apex of the terminal joint‖. Another remarkable circumstance renders the tarsi in both these genera conspicuous, the underside of the three last joints is covered by large membranaceous hairy vesicles¶, which, as I gather from Professor Peck's figure**, in the living or recent insect are inflated; but in old specimens, the air escaping, they become flaccid, and look rather like an appendage than a part of the foot. De Geer has observed, both with respect to *Thrips physapus* and several *Acari*††, that their foot is terminated by a vesicle. And, lastly, to close this long discussion, the last ventral segment of the abdomen ends in a

* Tab. IX. *fig.* 1. 2. 11. *fig.* 5. b b. *fig.* 6. a a.

† *Fig.* 2. u. q. *fig.* 3. e. *fig.* 5. d d. *fig.* 6. c c. *fig.* 7. a.

‡ *Fig.* 2. t. 3. d. 5. cc. 6. b.

§ *Mon. Ap. Angl.* i. *tab.* 14. *n.* 11. *fig.* 1. *Sow. Brit. Miscell. n.* 9. *pl.* 45. *fig.* 4.

‖ Tab. IX. *fig.* 9. a. ¶ *Fig.* 8. 8. c. ** Tab. VIII. *fig.* 13.

†† *Tom.* iii. *p.* 7. *pl.* i. *fig.* 1. ppp. *Tom.* vii. *p.* 84. *pl.* 5. *fig.* 6. 7. l. and *fig.* 19. n.

reflexed

reflexed process*, which has nothing parallel to it in any other order.

From the above observations I trust it will appear with sufficient evidence, that insects which exhibit so many peculiarities in their first, middle, and final state, are by such singularity of metamorphosis and conformation entitled to the distinction of forming a new order in an Entomological System.

But perhaps it may be objected, that it is scarcely worth while to form a new order for the sake of two genera only, and that it would be better to refer them to that, amongst those already established, with which they are most nearly connected. It will be sufficient to observe by way of reply to this objection, that this is not usually done even in an artificial system; for every botanist knows that many of the Linnean orders originally consisted of only single genera, and that some of the classes themselves included very few: thus, for instance, *Heptandria* had only three genera in two orders, and *Dodecandria* seven genera in five. Much less is it allowable in a natural system, the object of which is to discover the laws established by the Creator of all things, and to point out and adhere to those boundaries by which he has separated one order of beings from another: and the Linnean system of Entomology is a near approach to the natural system, although still capable of improvement. Whoever, therefore, upon good and sufficient grounds, establishes a new natural order, does his part towards carrying it to that perfection of which it is susceptible.

It now remains that I propose a denomination for this new order, assign to it its place, and lay down its characters and those of the genera which belong to it. *Strepsiptera*† is the term I propose by which to designate the order, which name I have

* Tab. IX. *fig.* 14 and 15. b.

† Them. στρεψις and πτερον.

given

given it on account of its distorted elytra. With respect to the place of *Strepsiptera* in the system, it seems to me that this order should follow *Coleoptera*; for, its metamorphosis being different from that of *Orthoptera* and *Hemiptera*, and nearer to that of *Coleoptera*, this seems its most natural station, considered as an elytrophorous order, especially, since, if it be inserted between *Orthoptera* and *Hemiptera*, with both of which it has some affinity, it would interrupt the series of *semicomplete* metamorphosis, by which, besides other characters, those two orders are so closely united.

I shall next attempt to lay down in detail the characters by which the *Strepsiptera* are distinguished, giving an *artificial* and *natural* as well as an *essential* character of the order: the second of these, the *natural* character, I shall endeavour so to construct as to include all such features as are common to the two genera of which the order at present consists; but I must first observe, that a describer of these insects, who would wish to get an accurate idea of all their characters, labours under considerable disadvantages, not only from the minuteness of the animals, but also from their dark opaque colour and velvet appearance, which conceal the sutures of many parts of the body altogether, unless they are viewed under a powerful magnifier with a strong light thrown upon them: and few, like myself, can possess the advantage of the eye and luminous pencil of a Bauer.

INSECTA.

INSECTA. ORDO II.

STREPSIPTERA.

Character Essentialis.

Elytra lateralia alas haud tegentia.

Character Artificialis.

Elytra antica lateralia distantia distorta coriacea alas nullo modo tegentia.

Alæ omninò apertæ radiatæ* longitudinaliter plicatiles.

Abdomen trunci processu corneo seu proscutello supra munitum.

Character Naturalis.

CORPUS oblongum vel lineari-oblongum, subcylindricum, cute corneâ cataphractum.

CAPUT sessile, trunco latius, transversum, magnum†.

Os cum *Labro Labio* et *Maxillis* obsoletum et vix ullum‡.

Mandibulæ duæ corneæ elongatæ, lineares, angustissimæ, edentulæ, apice forficatæ acutæ, sub capite apud basin palporum intus insertæ§.

Palpi duo biarticulati, valde distantes, sub capite inserti||.

Antennæ inter oculos in acetabulo frontis insertæ: basi stipite communi crasso bi- vel triarticulato, articulis brevissimis, ramis duobus elongatis terminato, unde bipartitæ evadunt¶.

Oculi apophysi pedicellari laterali brevi crasso cylindrico capitis adnati, magni, hemisphærici, ex pluri-

* By this term I mean to signify that the nerves diverge like rays.

† TAB. IX. *fig.* 10. ‡ TAB. VIII. *fig.* 9. c. § *Ibid.* a. || *Ibid.* b.

¶ TAB. IX. *fig.* 10. b c. 11. 12. *Brit. Misc. ubi supra, fig.* 5. a b.

bus

bus hexagonis crystallinis planiusculis septo elevato sibi invicem separatis, unde et cellulosi, constantes*.

Vertex pone columnos oculiferos plagâ elevatâ utrinque notandus†.

Truncus oblongus‡.

Thorax collariformis, brevissimus, transversus§.

Dorsolum transversum, breve‖.

Scutellum subtriangulare¶.

Postscutellum obsoletum.

Lumbi magni, latera trunci fere tota occupantes, subrhomboidales, convexiusculi: lateribus deflexis concavis**.

Interlumbium triangulare: vertice acuminato††.

Postlumbium declive aut verticale‡‡.

Proscutellum conicum, subcalceoliforme, productum, convexum, ascendens, abdominis basin obumbrans et muniens§§.

Pectus et *Sternum* sub pedibus anticis delitescentia vix discernenda.

Peristethium (*Illiger*) a pedibus intermediis omnino occultatum.

Scapularia (*Illiger*) subtriangularia, ante basin alarum posita‖‖.

Pleuræ (*Illiger*) longitudinales, latiusculæ et ferè lanceolatæ¶¶.

Parapleuræ (*Illiger*) longitudinales, sublineares, anticè attenuatæ,

* *Brit. Misc. fig.* 4. aa. Tab. IX. *fig.* 10. dd. † *Ib.* ee. ‡ *Fig.* 1. bcdefghikl.
§ *Ibid.* b. ‖ *Ibid.* c. ¶ *Ibid.* e.
** *Ibid.* and *fig.* 2. ff. †† *fig.* 1. h. ‡‡ *Ibid.* i.
§§ *Ibid.* and *fig.* 2. k. ‖‖ *fig.* 4. c. ¶¶ *Ibid.* d.

attenuatæ, apice subclavatæ et inter basin alarum et scapularia interpositæ, pleuris a parte inferiori parallelæ*.

Mesostethium (*Illiger*) amplum, subpanduriforme, posticè medio longitudinaliter canaliculatum: *Mediosterno* aut *Poststerno* extante nullo†.

Femoralia magna, crassa, apice rotundata, posticè attenuata, basi gibba, abdomen utrinque munientia‡.

Elytra coxis pedum anticorum, ut videtur, affixa, coriacea, linearia vel ferè cochleariformia, a corpore primùm divergentia, iterum id versùs incurva, et demum recurva, unde quasi distorta evadunt, alas nullo modo tegentia§.

Alæ amplæ, submembranaceæ, circuli quadrantis figurâ æmulæ, longitudinaliter plicatiles, radiatæ, sive nervis omnibus simplicibus divergentibus‖.

Pedes longitudine subæquales, compressi: anterioribus 4 approximatis; posticis 2 remotis.

Coxæ 4 anteriores brevissimæ et difficillimè distinguendæ; posteriores 2 longiores magis conspicuæ¶.

Trochanteres femorum basin omnino intercipientes: anterioribus 4 elongatis magnis; posticis 2 brevioribus**.

Femora ferè semiovata††.

* Tab. IX. *fig.* 4. e. † *fig.* 5. a.
‡ *fig.* 1. 2. 11. *fig.* 5. b b. *Brit. Miscell. ubi supra, fig.* 7. b.
§ Tab. IX. *fig.* 1. 2. d d. *fig.* 3. a b. ‖ *fig.* 1. g g.
¶ *fig.* 2. d. *fig.* 5. c c. *fig.* 6. b.
** *fig.* 2. u. q. *fig.* 3. e. *fig.* 5. d d. *fig.* 6. c c. *fig.* 7. a.
†† *fig.* 5. e e. *fig.* 7. b.

Tibiæ

Tibiæ apicem versus sensim crassiores, inermes: posticis duabus brevibus*.

Tarsi omnes 4-articulati: articulo primo reliquis majori; sequentibus ferè obconicis, subtus membranâ vesiculari suffultis; extimo mutico†.

Abdomen lineare, marginatum: segmentis 8—9.‡

STYLOPS§.

Character Essentialis.

Antennæ bipartitæ: ramo superiori articulato.

Character Artificialis.

Antennæ bipartitæ: ramis compressis; superiori articulato.
Oculi pedunculati, subcellulosi.
Abdomen retractile carnosum.

Character Naturalis.

CORPUS oblongum.

Caput. *Mandibulæ* apice paulo crassiores‖.

Palpi articulo primo magno, obconico, compresso; secundo semiovato acuto: subtus concavo¶.

Labrum, vel processus *labri* loco, porrectum, acutum**.

Nasus obtusus, ante antennas prominens et labrum obumbrans.

Antennæ stipite biarticulato: articulo primo sequente

* Tab. IX. *fig.* 5. f f. *fig.* 7. c. † Tab. VIII. *fig.* 13. Tab. IX. *fig.* 8. 8. ‡ *fig.* 1. 2.

§ *Monogr. Ap. Angl.* i. *tab.* 14. *n.* 11. *fig.* 1—9. ii. p. 110—114. *Sowerby Brit. Misc. n.* 9. *p.* 93—5. *tab.* 45. *Latr. Gen. Crust. Ins.* iv. *p. ult.*

‖ *Monogr. Ap. Angl.* i. *t.* 14. *n.* 11. *fig.* 2. 5. b. and *Brit. Misc. ubi supra, fig.* 5. d d.

¶ *Ibid. fig.* 2. 5. a. and *fig.* 5. c.

** I am unable to determine, from my imperfect specimens, whether this really be the *labrum* or not. There seems nothing answerable to it in *Xenos*.

longiori,

longiori, clavato vel obconico; apice obliquè truncato; secundo brevissimo, cylindrico, ramos duos emittente: inferiori paulo breviori, lanceolato et ferè auriformi, compresso, exarticulato supra concavo; superiori compresso, triarticulato: articulo primo longiori sublineari extrorsum paulo latiori; secundo brevi, tertio brevissimo apice rotundato, linearibus tenuioribus*.

Oculi hexagonis numerosis; septis minùs elevatis, unde subcellulosi evadunt.

Truncus. *Scutellum* apice obtusum.

Interlumbium posticè valde convexum.

Postlumbium ferè verticale, corneum.

Proscutellum subtus cavum†.

Pedes trochanteribus posticis elongatis; tarsis articulo extimo fisso‡.

Abdomen carnosum intra processus trunci retractile: segmento extimo ventrali processu styliformi reflexo armato.

Larva nondum visa, in *Melittarum* corpore parasitica latet.

Pupa intra corpus Melittæ refocillata: corpore carnoso; capite corneo exserto; oculorum operculis cæcis§.

Metamorphosis coarctata?

XENOS‖.

Character Essentialis.

Antennæ bipartitæ: ramis exarticulatis.

Character Artificialis.

Antennæ bipartitæ: ramis semiteretibus exarticulatis symmetricis.

* Tab. IX. *fig*. 12. a b. and *Brit. Misc. fig*. 5. *a b*.

† Tab. IX. *fig*. 6. d.

‡ *fig*. 9. a.

§ *fig*. 17. and *fig*. 18. a a.

‖ *Rossi Fn. Etrusc. Mantiss. Append. Gen.* cxv. p. 114—116. *t.* 7. *fig*. B *b*. *Soc. Philomath. de Paris. Bull. Mai et Juin* 1794. *n*. 23. 24. *Descr. n*. 22. *Latr. Gen. Crust. et Ins. t*. iv. *p. ult.*

Oculi

Oculi pedunculati cellulosi.
Abdomen exsertum corneum: ano carnoso.

Character Naturalis.

CORPUS lineari-oblongum.

Caput. *Mandibulæ* subflexuosæ, medio crassiores, acutæ*.

Palpi articulo primo compresso flexuoso; secundo ovato acuto†.

Labrum nullum aut obsoletum.

Nasus acutus, inter antennas frontem terminans‡.

Antennæ stipite triarticulato§: articulis brevissimis; primo sequentibus paulo longiori ferè obconico; apice obliquè truncato; ultimo ramos duos semiteretes: superficie interiori plano; exteriori convexo; a basi ad apicem magnitudine sensim decrescentes, symmetricos emittente‖.

Oculi cellulosi: hexagonis paucioribus, vix ultra 50; septis crassioribus magis elevatis¶.

Truncus. *Scutellum* apice subemarginatum**.

Postlumbium declive membranaceum.

Femoralia supra anticè concava.

Pedes coxis anticis brevissimis, reniformibus††; trochanteribus posticis coxis vix longioribus‡‡; femoribus posticis intus obtusangulis§§; tarsis articulo extimo integro‖‖.

Abdomen corneum, proscutello longius, vix retractile: segmentis octo; podice minuto lineari adunco supra terminatum,

* Tab. VIII. *fig* 9. a.
† *Ibid.* b b.
‡ Tab. IX. *fig.* 10. a.
§ *Ibid.* b.
‖ *Ibid.* c.
¶ *Ibid.* d d.
** *fig.* 1. e.
†† *fig.* 3. d.
‡‡ *fig.* 5. d d.
§§ *Ibid.* e e.
‖‖ *fig.* 8.

terminatum*, subtus stylo longiusculo lineari reflexo, basi dilatato; apice, ut videtur, fisso†? ano carnoso.

Larva in *Vespidarum* corpore parasitica, lanceolata, plicata, carnosa: capite variabili? compresso‡.

Pupa linearis carnosa intra abdomen *Vespæ* refocillata; capite exserto corneo; oculorum operculis fenestratis: fenestrulis hexagonis§.

Metamorphosis præcedentis.

Professor Peck considered the two insects from which I have formed these genera, merely as species of the same genus; but, not to mention the considerable diminution of the number of the hexagonal lenses in the eyes of *Xenos* and the much greater elevation and thickness of the septa which separate them, nor the cleft terminal joint of the tarsi in *Stylops*, or the abdomen fleshy in the latter and corneous in the former, besides other discrepancies of less importance, the very remarkable differences observable in the structure of their antennæ will, I think, fully warrant their separation. The singular fenestrated eye-covers, also, which form so very peculiar a character of the pupa of *Xenos*, and which are not to be found in that of *Stylops*, furnish another and very decisive argument for considering these insects as belonging to different genera.

Before I describe the insect I received from America, I shall give the diagnostic characters of Rossi's *X. Vesparum*, selected from those he has detailed in the work above alluded to, which will enable entomologists more easily to compare the two species together. I hope I shall stand excused for altering the trivial names by which both he and Professor Peck have distinguished their insects, since, as both are parasites of *Vespæ*, the trivial

* Tab. IX. *fig.* 15. a. † *Ibid.* b. ‡ Tab. VIII. *fig.* 1. 3. 4. § *fig.* 7. a a. *fig.* 8. a.

 names

names *X. Vesparum* and *Vespæ* would lead to confusion ; and, besides, a species should not be named from a *habitat* which is common to several or to a genus. I shall name one *Xenos Rossii*, and the other *Xenos Peckii*, in honour of the two discoverers.

Xenos Rossii*.

X. ater, antennis: ramis compressis, tarsis fuscis.

Habitat in *Vespa Gallica.*

DESCR. CORPUS atrum, fuliginosum.

Caput parvum. *Palpi* articulo primo brevi rotundo, altero elongato compresso. *Antennæ* breves vix capite longiores: ramis compressis et quasi ensiformibus.

Truncus. Tarsi (quatuor ?) fusci ; subtus albidi.

Xenos Peckii.

X. nigro-fuscus, antennis: ramis semiteretibus dilutioribus albo punctatis, ano pallido, pedibus luridis: tarsis fuscis.

Long. Corp. $1\frac{1}{2}$ lin.†

Hab. Larva et Pupa in *Poliste fuscata* Fabr. Americæ.

DESCR. CORPUS nigro-fuscum, ex pube brevissima et nisi sub lente forti omnino inconspicua opacum et quasi velutinum.

Caput inter antennas longitudinaliter elevatum et ferè carinatum. *Palpi* articulo primo secundo longiori‡. *Antennæ* capite longiores: ramis magis dilutè fuscis, subdiaphanis, punctis minutissimis albis, et, uti suspicor, hexagonis, nisi sub lente forti vix conspicuis irroratis§.

* *Rossi, ubi supra.*

† Professor Peck sent the measures taken by an accurate micrometer from recent specimens, as follows: Length of the body $\frac{15}{100}$ inch. Breadth of the head at the eyes $\frac{4}{100}$ inch. Length of one antenna $\frac{4\frac{1}{2}}{100}$ inch.

‡ Tab. VIII. *fig.* 12. § Tab. IX. *fig.* 10. b c.

Truncus.

Truncus. *Thorax* posticè in medio obtusangulus. *Scutellum* longitudinaliter et late canaliculatum. *Postlumbium* pallidum. *Alæ* cinereo-albidæ: margine crassiori, nervisque nigris. *Pedes* cinerei vel potiùs luridi: tarsis nigricantibus.

Abdomen reliquo corpore magis obscurum: ano pallide rufescenti.

Rossi, in his description, which, extraordinary as he deemed his insect, appears to have been drawn up from a very cursory and inaccurate survey of it, mistakes the mandibulæ for setæ, and seems not to have traced them to their point of insertion under the head, since he merely says "*Labium breve, medio setigerum.*" He takes no notice either of the eyes being placed on a footstalk or pillar, or of the remarkable processes which defend the base of the abdomen on each side; nor do they appear in his figure: yet I cannot suppose that his insect wants these singular characters. The elytra he regards as an appendage of the thorax something similar to the *Halteres* of the *Diptera.*

Upon comparing the above descriptions of *X. Rossii* and *X. Peckii* together, we find that they not only differ in colour, but also in the length of the first joint of the palpi compared with the second, and in the shape of the branches of the antennæ. Rossi also makes no mention of the minute white dots which render those of *X. Peckii* so remarkable: therefore I feel little or no hesitation when I give them as distinct species.

The branches of the antennæ of Professor Peck's species, from their inner surface being plane, under certain circumstances are probably applied to each other, so as to form a single columnar branch gradually decreasing in diameter. What may be the use of these extraordinary organs? In the present instance, from their being semi-transparent and the white dots with which they are so thickly

thickly bestrewed, I feel something of a suspicion, that like those of *Pausus sphærocerus** they may emit a phosphoric light, and serve to guide the insect in the dark labyrinths it may have occasion to explore. I give this, however, as mere conjecture.

Professor Peck, as we have seen, obtained his specimens of *X. Peckii* from *Polistes fuscata* Fabr.; but the *Vespa* in which I found the exuviæ mentioned in Mr. Sowerby's British Miscellany was quite a different species, and a true *Vespa* Fabr. The eye-covers in these exuviæ are similar to those in the Professor's insect; but whether they belonged to the same or another species, since other species may be attended by the same peculiarity, cannot be certainly known. As the *Vespa* in which I found them appears to be non-descript, I shall here add a description of it as connected with the subject of this paper.

Vespa concolor.

V. atra tota, mandibulis elongatis forficatis, abdomine: segmento secundo basi utrinque lineolâ elevatâ.

Long. Corp. lin. 7.

DESCR. CORPUS atrum, glabrum, obscurum.

Caput trunci fere latitudine punctatum. *Mandibulæ* elongatæ; apice forficatæ acutæ; intus tridentatæ: dentibus obtusis; supra longitudinaliter elevato-lineatæ. *Labrum* minutum, integrum. *Nasus* apice emarginatus.

Truncus punctatus, anticè linea elevata dorsali lævi. *Alæ* nigræ, colore violæ paululùm tinctæ. *Tarsi* unguibus testaceis.

Abdomen ovato-lanceolatum, læviusculum, ex tomento parvo fuscescenti reliquo corpore magìs obscurum: segmento secundo (ut in plurimis vespis obtinet) magno sub-

* Trans. Linn. Soc. iv. p. 261.

campaniformi;

campaniformi; basi utrinque lineolâ elevatâ longitudinali. *Venter* segmento primo in medio declivi, exinde transversè striatulo, apice ipso lævi membranaceo fulvescenti; segmento secundo brevissimo valde depresso; tertio ascendenti convexo, adeo ut inter primum segmentum et tertium vallecula profunda interponitur. *Anus* incurvus.

The heads of the pupæ of this species of *Xenos*, as Rossi also states to be the case with his, emerge at the fourth dorsal segment of the abdomen.

EXPLANATION OF THE PLATES.

Tab. VIII.

Professor Peck's *Figures.*

Fig. 1. Larva of *Xenos Peckii*, natural size.
2. Perfect Insect ditto.
3. Larva magnified seen on the back.
4. Head of ditto seen laterally, much magnified.
5. Abdomen of a wasp with part of one of the segments cut away to show the position of the pupa of ditto in its body. a. Pupa.
6. *Polistes fuscata* Fabr. with three of the pupæ of ditto in its abdomen at a a.
7. Operculum which separates from the other part of the shell of the pupa of ditto when the imago comes forth. a a. The eye-covers beset with hexagonal lenses.
8. *Xenos Peckii* magnified.
9. Head of ditto underside. a. Mandibulæ. b b. Palpi. c. Oral depression.
10. Ditto upper-side. a. Mandibulæ.
11. Front view of ditto. a. Mandibulæ. b b. Palpi.

12. One

12. One of the palpi seen laterally.
13. Tarsus of ditto, a. the vesicles inflated.
14. Two or three terminal joints of the abdomen seen obliquely, exhibiting the styloid process reflexed.

TAB. IX.

Additional Figures by FR. BAUER, *Esq.**

Fig. 1. *Xenos Peckii* magnified. a. The head. b. The anterior piece of the trunk answering to the thorax in *Coleoptera* and to the collar in *Hymenoptera*; behind it is obtusangular. c. The second piece of the trunk called the *Dorsolum*, which answers to what has been principally taken for the thorax in *Hymenoptera*. In *Coleoptera* it is covered by the thorax. It corresponds with a. in fig. 31. dd. Elytra. e. Scutellum corresponding with b. in fig. 31. ff. Lumbi answering to d d. in ditto. g g. Wings. h. Interlumbium answering to e. in ditto. i. Postlumbium answering to f. in ditto. k. Proscutellum. This has no corresponding part in other insects. ll. Femoralia or lateral processes which defend the sides of the abdomen. m. Abdomen. n. Podex, or upper terminal segment. o. Styloid process or oviduct.

2. Lateral view of ditto. a. to o. refer to the same parts as in fig. 15, only in f. the concave sides of the lumbi are better seen. p. The posterior Coxa. q. Trochanter. r. A zigzag elevation of the anterior part of the lumbi, below which the wings are attached to the trunk. s. A piece between the coxæ of the anterior legs and the termination of the above line, which, perhaps, may assist in

* *Figs.* 2. 5. 7. 18. TAB. IX. are magnified 15 times diameter or 225 times superficies; *figs.* 3. 8. 10. 11. 14. 15., 30 times diameter or 900 times superficies; *fig.* 16, 3 times diameter or 9 times superficies; *fig.* 17, 7 times diameter or 49 times superficies.

giving

giving motion to the elytra. t. The reniform coxa to which the elytra appear to be attached. u. The trochanter of the anterior leg.

Fig. 3. An Elytrum with part of the anterior leg. a. The exterior or convex side of the elytrum. b. The interior or concave side. c. The piece between the zigzag line (*fig.* 16. r.) and the anterior coxa. d. Coxa. e. Part of the Trochanter.

4. Part of the side of the trunk. a. Part of the wing. b e. Parapleura. b. The end of ditto on which the wing seems to sit. c. Scapulare. d. Pleura. f. Part of the Mesostethium. g. Part of the Femorale.

5. Posterior part of the underside of the trunk. a. Part of the Mesostethium. b b. Femoralia or lateral processes. c c. The posterior Coxæ. d d. Posterior Trochanters. e e. Femora. f f. Tibiæ. g. Tarsus. h. Vesicles.

6. Part of the underside of the Trunk of *Stylops Melittæ.* a a. Femoralia. b. Coxæ. c c. Trochanters. d. Proscutellum hollow below.

7. An intermediate leg of *Xenos Peckii.* a. Trochanter. b. Femur. c. Tibia. d. Tarsus.

8. 8. Front and lateral view of one of the tarsi. a. Part of tibia. b. Tarsus. c. Vesicles.

9. Part of the leg of *Stylops Melittæ.* a. Bifid apex of tarsus.

10. Head of *Xenos Peckii.* a. Nasus. b. The triarticulate stipes of the antennæ. c. The two branches dotted with hexagons ? which proceed from it. d d. Eyes. e e. Elevated spaces behind ditto.

11. Part of the antenna of *Stylops Melittæ* to show its flat branches.

 27. Ditto

Fig. 12. Ditto viewed laterally. a. The first joint of the stipes. b. The second. c c. Part of the two branches.

13. Antenna of *Gyrinus natator*, which is likewise bipartite. a. The stipes embedded in the head. b. A shorter exterior auriform branch ciliated with hairs, intended probably to shelter the inner branch. c. The inner branch or genuine antennæ.

14. 15. The four last segments of the abdomen of *Xenos Peckii.* a. Podex. b. The reflexed style.

16. The trunk of *Buprestis vittata* after the thoracic shield is taken away. It is inserted in this plate to explain the corresponding parts in the trunk of *Xenos.* a. Dorsolum. b. Scutellum. c. Postscutellum. d d. Lumbi. e. Interlumbium. f. Postlumbium. g. Nates. h. Posterior cavity of the trunk.

17. Pupa of *Stylops Melittæ* after it had been some time extracted.

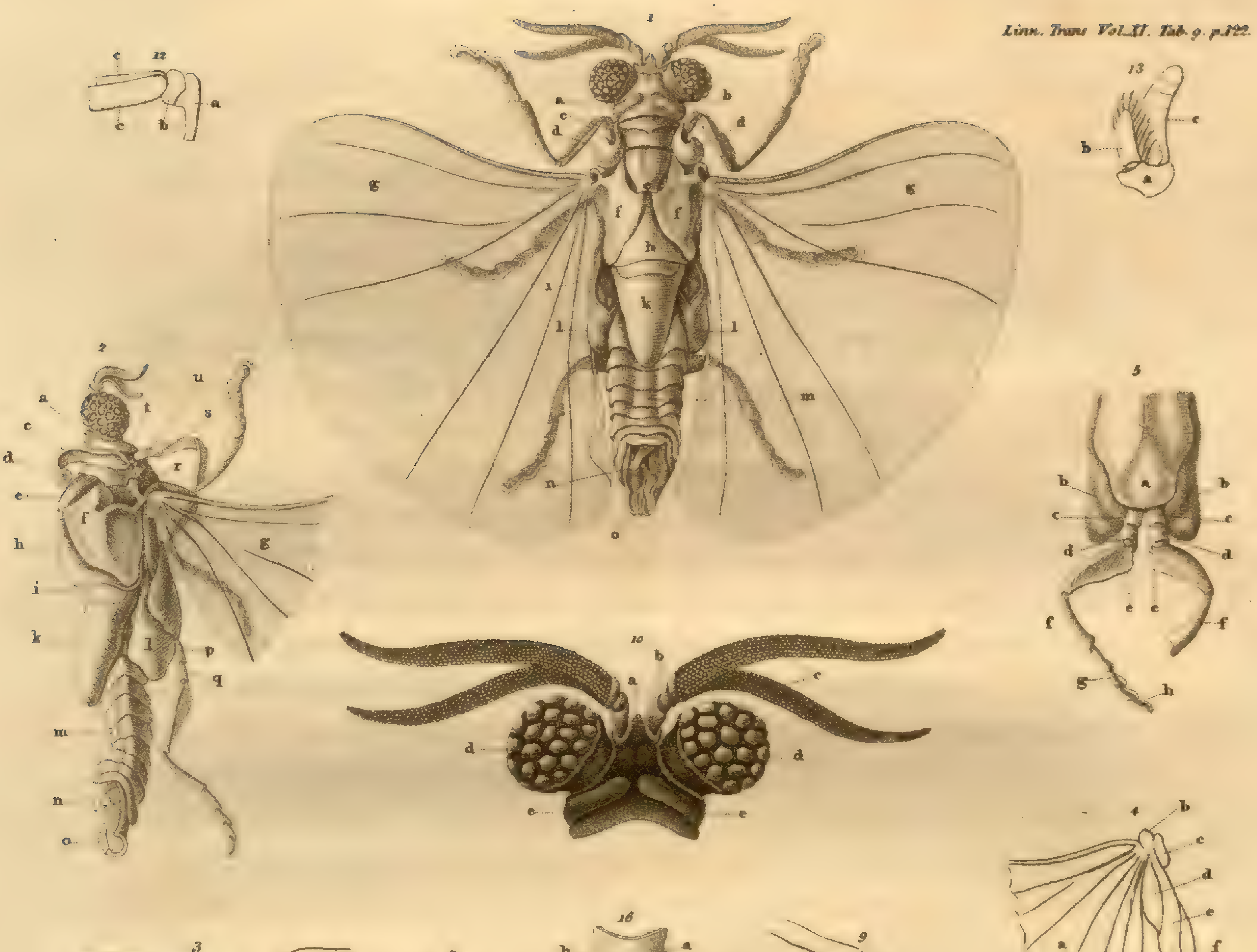
18. Head and Neck of ditto. a a. Eye-covers.

N.B. This plate is defective in giving no figures of the under side of the anterior part of the trunk; but this could not be done with accuracy without partly destroying the specimens.

VII. *A Mo-*

W. D. Peck delin.

Warner Sculp.



Fr. Bauer delin.

Warner Sculp.

VII. *A Monograph of the British Species of the Genus Choleva.* *By William Spence, Esq. F.L.S.*

Read December 19, 1809.

It must have struck the Entomologist who has attended to the philosophy of his science, that Linné, in his institution of entomological genera, has been guided by a rule very different from that which he has followed in the sister science Botany. In the latter, his genera are numerous. When a tribe of plants was marked by a peculiar habit, he seldom scrupled to erect it into a distinct genus, even though obliged in some of the natural families to adopt very slight and evanescent generic characters. And where a plant decidedly differed in its inflorescence from every known genus, he rarely allowed similarity in habit to be any bar to its separation into a new one. In Entomology, on the contrary, his genera are extremely few; and of these a great proportion are clearly natural families: while at the same time, under more limited genera are not seldom included insects diametrically at variance with the generic character. But if, in Botany, the *Cruciatæ, Papilionaceæ*, &c. were to be regarded as families composed of several genera; so, on every principle of analogy, ought the Linnean entomological genera *Scarabæus, Curculio, Cerambyx, Musca*, &c., each of which includes tribes of insects of the most opposite œconomy, and most distinct and peculiar habit. And if

 a variation

a variation in one essential character was deemed by Linné sufficient to entitle a single plant to rank as a genus, he ought unquestionably to have followed the same rule in Entomology.

Two solutions of this anomaly in the practice of our great head, present themselves. One, that chiefly occupied with botanical labours,—labours of which a tithe might well have employed the life of any ordinary man,—he had not leisure to give equal perfection to the other departments of natural history. The other, advanced by Fabricius in the preface to his first work the *Systema Entomologiæ*, and again repeated in his *Philosophia Entomologica*, that Linné, conscious of the imperfections and insufficiency of his entomological system, avoided the multiplication of genera, from fear of increasing that confusion which he was aware had in part arisen*.

The latter supposition, few but the devoted disciples of Fabricius will assent to. The former is more plausible, and is, in some measure, confirmed by the circumstance of Linné's having regarded natural families as genera in the Cryptogamic department of Botany, just as he has done in Entomology.

The incorrectness of both conjectures, however, may be inferred from a passage in the *Biga Insectorum*, the last of Linné's entomological labours, and composed when old age had matured his judgement. In this work the following paragraph occurs: "Plurima insectorum genera jam tum esse detecta, observamus, eorum considerat̂a historiâ. Dom. Doct. Thunberg, qui singularem omninò operam rebus impendit entomologicis, per literas commemorat, se sub triennii ad Caput Bonæ Spei vix ullum genus novum reperire potuisse; et longius latiusque peregrinatus Dom.

* "Perspexit perbene summus Vir defectum systematis in characteribus genericis, ideoque rarissime nova genera condidit, ne e characteribus hisce vacillantibus accumulatis, major oriatur confusio." *Syst. Ent. Prolegom.* p. 9. See also *Philos. Ent.* p. 85 and 92.

Doct.

Doct. Forster, qui regiones invisit circa polum antarcticum sitas, neque ibi nova insectorum genera, sed paucissimas tantummodò species, se deprehendisse, narrat. Unde patet, genera insectorum nova admodum esse rara, nisi ante cognita quispiam vellet separata, ut *Hydroum* a *Dytiscis*, *Ipsidem* a *Dermestibus*."

From this it is obvious that Linné neither admitted the instability of his entomological system, nor was conscious of its incongruity with that which he had adopted in Botany. From his own long continued observation, and that of his travelling pupils, he infers, that few new genera of insects exist. And though he seems to admit that some of the old genera might be divided, the examples which he cites, prove that he was far from contemplating any general or numerous divulsions of this kind.

The anomaly in question may probably be more satisfactorily explained by adverting to the small number of entomological compared with botanical objects, with which Linné was acquainted. In that process of generalization which the mind adopts for the purpose of easily recollecting numerous facts, upon which is founded the institution of the groupes of natural objects termed genera, we do not usually subdivide our assemblages of ideas, until their accumulation has rendered it necessary. No more than 87 species of *Scarabæus*, 95 of *Curculio*, and 83 of *Cerambyx*, had ever been seen by Linné. Had he known the 657 species of his genus *Scarabæus*, the 725 of *Curculio*, and the 485 of *Cerambyx*, which crowd the pages of Fabricius's last work, there can be no reasonable doubt that he would have admitted the claim of such hosts to be deemed each a natural family including several genera, to be fully as well founded as that of the Papilionaceous, Umbelliferous, and Cruciate tribes of plants. And if he thought it proper to divide 893 species of Coleoptera (the whole number described in the last edition of the *Systema Naturæ*) into 30 genera, it

it is not likely that he would have objected to the division of the three just mentioned, now alone including twice as many species, into the 31 genera under which Fabricius has disposed them; or even into a greater number, if sufficient and obvious generic characters could be selected. The botanist who recollects his own original feelings of repugnance to the Hedwigian separation of the Mosses, or the Acharian of the Lichens; or the local entomologist who remembers what was his aversion to adopt many of the new genera of insects of modern authors until the inspection of foreign collections had enlarged his views—will see nothing unnatural, or injurious to the fame of his great master, in the supposition that the arrangements of his vast mind were bounded by the extent of his experience, and proportionably contracted where his observations were few.

Whatever was the cause of Linné's instituting so few entomological genera, succeeding authors soon saw the necessity of increasing the number. Geoffroy was the first to attempt much in this way, and for the most part with success. But Fabricius is the author who has established the most new genera; and if he had confined himself to improving the Linnean method, his efforts alone would by this time have brought Entomology to a high degree of perfection. Unhappily his notion that in insects the generic characters ought to be drawn, as they are in plants, from one class of organs only, and his ambition to be the founder of a new system, led him to build his genera upon parts which in nine cases out of ten it is impossible to see, and which, when seen, frequently do not afford characters so valuable as those which may be derived from more obvious organs. And it may be affirmed with perfect truth, that if Fabricius's generic characters were stripped of those explanatory accessories which he did not admit to be essential to them, it would be next to impossible for

for a tyro ever to make out a single insect by his works. Fortunately the arduous labours of this undoubtedly excellent entomologist are not greatly vitiated by the unsoundness of the base on which they rest. Fabricius is an almost solitary instance of the founder of a system entirely neglecting his own peculiar principles, and acting in nearly every instance agreeably to those which he professes to supersede. He has not, perhaps, constructed any one of his genera upon its Instrumenta Cibaria. Habit alone has evidently in almost every case led to their separation, th echaracters of the Instrumenta Cibaria of one species of each genus being for form's sake placed at its head. It is only upon this supposition that we can account for the undeniable facts, that many of the genera into which Fabricius has split some natural families (as *Scarabæus* and *Cerambyx* Linn.), though differing essentially in habit, have little or no difference in their Instrumenta Cibaria; and on the other hand, that all his large genera include insects which, having some affinity in point of habit, are yet *toto cœlo* at variance with their generic characters. From this inconsistency has resulted the good consequence, that the bulk of the Fabrician genera are *natural*, and, when designated by intelligible and distinctive characters, may be adopted into any system.

The generic subdivisions, however, for which Entomology has to thank Fabricius, are much fewer than even the present state of the science demands, and probably not one fourth that will hereafter be called for. It is contrary both to analogy and experience to suppose that the Creator has formed fewer of those groupes into which we divide the vast tribes of nature by the name of genera, in one department than in another. Now in Botany, in which not more than about 20,000 species have been described, we have upwards of 2000 genera. In Entomology at least

least as many species are already described ; and when we combine the circumstances that in Britain not fewer than 8000 species of insects are to be found, while we have but about 3000 plants; that these are probably not one half of the European insects, while we know that every other quarter of the globe is still more prolific in species wholly different; and lastly, that every kind of plant probably affords nutriment on the average to three or four species of insects, there can be little doubt that the insect is vastly more populous than the vegetable world. Is it likely, then, that the number of genera should be much fewer than in Botany; or at any rate that it should not very greatly exceed its present amount?—We need not fear that the science will be rendered more difficult by an augmentation of its genera. This cannot happen if a proper system be adopted. If two or three insects, or even a single one, be strikingly characterized by peculiarity of habit, they certainly ought in any system to be distinguished at least as sections of the genera under which they are placed. And will it increase the difficulty of investigation if they be established as genera upon the same characters, and distinguished by a name? Clearly not. On the contrary, the science can be effectually promoted in no other way; for names have an important influence upon the clearness of our ideas, and it will be impossible for us ever to gain correct views of the philosophy of our science, while genera essentially distinct are jumbled together under one title.

Entomology, therefore, is under the greatest obligation to Illiger in Germany, and Latreille in France, who having had the good sense to reject the useless while they retain the valuable parts of Fabricius's system, are labouring, by the institution of new genera built upon firm and intelligible characters, to extricate the science from the chaos into which that author has unwittingly

wittingly reduced it. Fabricius's system has now had a fair trial of upwards of thirty years, and it was at one time universally followed on the continent; yet so far is experience from having confirmed the assertion of its author, that the Linnean system is only calculated to introduce confusion into the science, that the very system professing to dissipate that confusion is even now fast sinking into oblivion, while the Linnean orders and generic characters, with such improvements as reason and analogy suggest, and as Linné himself would have approved, are reverted to by the most acute and learned entomologists of the age.

These observations, called for in some measure by the state of entomological opinion in this country, will not, I trust, be deemed an inappropriate introduction to the description I have here attempted of the British species of the genus *Choleva*—one of those which have been recently separated from the genera established by Linné.

By preceding authors, its species were referred to *Mordella*, *Dermestes*, or *Tritoma*. But between the years 1796 and 1800 not fewer than four entomologists, Latreille, Illiger, Paykull and Frölich, recognised their claims to be ranked under a distinct genus; each, from ignorance of the other's intention, selecting a different generic name. Of these, that of Latreille, having the priority in point of date, has been here adopted.

It may seem superfluous, perhaps, to attempt a new elucidation of a tribe which has engaged the attention of so many eminent entomologists; but it will probably be deemed a sufficient apology for this apparent presumption, to state, that our British cabinets contain at least nine yet undescribed species; and that I have attempted in the following arrangement to facilitate the investigation of the genus, by an attention to sectional and specific characters, hitherto unnoticed.

 Without

Without dwelling upon these, which will be sufficiently pointed out by the subsequent detailed descriptions, I shall pass on to a few remarks relative to the natural affinities of the genus.

As far as mere external appearance is concerned, *Choleva* has a considerable resemblance to *Mordella.* It has the same arched body, abdominal laminæ (as the posterior coxæ have been termed) and elongated feet. But this resemblance is merely superficial; and when we compare the parts of each, we see at once that *Choleva* which has subulated palpi, clavate antennæ, and setaceous tarsi of five joints, cannot justly be considered of the same genus with *Mordella* which has filiform antennæ, securiform maxillary palpi, and compressed posterior tarsi of four joints. The genus *Anisotoma* of Knoch (including *Silpha polita* Ent. Brit. &c.) can claim a more essential relationship to *Choleva.* The antennæ have the same short eighth joint, (a character peculiar, as far as I know, to these two genera and some species of two others to be mentioned hereafter,) the palpi are not very dissimilar; and though the body is more convex and hemispherical, there are not wanting species which in some degree supply the connecting links. But not to dwell upon the difference in the shape of the antennæ, which in *Anisotoma* are much shorter, with the club more distinct and compressed; the circumstance of the last genus having but four joints in the posterior tarsi, is alone a sufficient reason for regarding *Choleva* as distinct. *Dermestes* and *Silpha* (particularly the family of the latter with clavate antennæ excluding *S. obscura*, &c.) are the only two remaining genera known to me that have any affinity with *Choleva.* They have a similar œconomy, and in two or three species of the latter (e. g. *S. thoracica*, *rugosa*, and *sinuata*,) the eighth joint of the antennæ, is, though very slightly and inconspicuously, shorter than the one preceding it. But in *Dermestes* the short antennæ with

with a distinct triarticulate clava, the different Instrumenta Cibaria, epipleuræ, posterior coxæ, and feet,—and in *Silpha*, the dilated margin of the thorax, the more depressed body, antennæ with triarticulate clava, and different Instrumentaria Cibaria &c., —afford discriminating generic characters amply sufficient. Latreille has associated *Choleva* in his "*Stirps tertia*" of his family "*Necrophagi*" along with *Scaphidium*, *Agyrtes*, and *Mylæchus*. *Agyrtes* I am not acquainted with. *Mylæchus* is unquestionably rightly placed here; but I greatly doubt the existence of any relationship between *Choleva* and *Scaphidium*. It is true that in one species (*Silpha agaricina* Linn. *Scaphidium acuminatum* Ent. Brit.) the eighth joint of the antennæ is shorter than those adjoining. But this is the only resemblance. The remarkably thin-stalked antennæ of *Scaphidium;* its large emarginate eyes; abbreviated elytra; acute abdomen; remote posterior feet and differently formed coxæ—in short the whole habit; strikingly remove it to a very wide distance from *Choleva*.

These remarks, imperfect as they are, on the affinities of the genus under consideration, lead us to its essential character. This is drawn from the relative short eighth joint and mucronate last joint of the more or less clavate antennæ, and the subulato-conical last joint of the incurved palpi; combined with the entire elytra and five-jointed tarsi. The first member of this character distinguishes *Choleva* from every other genus known to me except *Anisotoma*, one or more species of *Scaphidium*, and some of *Silpha**. The character drawn from the tarsi separates it from the first: that from the elytra from the second; and that from the palpi from the last.

* That singular insect *Dermestes Cassidoides* Ent. Brit., which has very properly been formed into a genus by Andersch, under the title of *Clypeaster* (a name, however, preoccupied in another Class) has, like *Choleva*, the fourth joint of the antennæ, from the *apex*, much shorter than the rest; but as in it the antennæ have but nine joints, it is the *sixth* and not the eighth joint from the *base* that is the shortest.

It may be necessary to add a few words relative to the species included under this genus by other authors, but not here described or referred to. Of the five enumerated by Frölich in his paper in the *Naturforscher*, the three first are true *Cholevæ:* the two last, *Luperus pallidus*, and *sanguinicollis*, with filiform antennæ, seem to belong to some other genus. The former is probably *Cyphon pallidus* of Fabricius, *Crioceris pallida* of Marsham. Of the six species of *Catops* described by Fabricius in the *Systema Eleutheratorum*, *C. sericeus, agilis*, and *Morio*, are doubtless true *Cholevæ*, and probably synonymous with species here described; though from the brevity of the descriptions it is not possible to be certain on this head. *C. vittatus* was before a *Tritoma;* and being described from Dr. Hunter's cabinet, which Fabricius could not refer to, its claim to be deemed a *Catops* is very doubtful; which may be said also of *C. flavipes*, a *Helops* of the *Ent. Syst.* This last is an American species with crenate striæ,—a character found in none else of the genus, and is, according to Illiger, a true *Cistela.* The remaining species, *C. rufescens* (*Tritoma minuta* Ent. Syst.) is very obscure. It is synonymed with *Chrysomela minuta* Linn., which is beyond all question one of the laminated *Dytici*, (*D. ruficollis* Ent. Brit.) and in the *Ent. Syst.* Fabricius gives as its habitat "In aquosis." This he has changed in the *Syst. Eleuth.* for "sub corticibus arborum:" but he still retains Linné's synonym, adding to it, surely very erroneously, *Ptomaphagus rufescens* of Illiger. The description is very short and inexpressive, so that it is impossible to guess what is meant by this species; and no cabinet is referred to.

It is somewhat remarkable that I have never observed a single species of this genus in any of the rich foreign cabinets of the metropolis.

CHO-

CHOLEVA.

CHOLEVA* *Latr.* PTOMAPHAGUS *Knoch, Illig.* CATOPS *Fab. Payk. Gyll.* LUPERUS *Frölich.* MORDELLA *Forster, Marsham.* DERMESTES *De Geer.* PELTIS *Geoffroy.*

Character Essentialis.

Antennæ subclavatæ: articulo octavo contiguis minori, extimo submucronato.

Palpi quatuor inæquales: exteriores fracti, articulo extimo subulato-conico.

Coleoptra integra.

Tarsi quinque-articulati, setacei.

Character Naturalis.

CORPUS parvum, agile, oblongum, sub-crassum, convexum, fornicatum, (vel anticè et posticè declive,) alatum, subtilitèr rugulosum, pube breve adpressâ vestitum, colore obscuro sed florido obductum.

CAPUT thorace minus, perpendiculariter inflexum, subtriangulari-ovatum, anticè subtruncatum, posticè rotundatum, margine posteriori acutissimo, collo valdè constricto thoraci insertum.

Oculi parvi, subhemisphærici, prominuli, laterales, in angulo postico capitis inserti.

* A χωλεύω, *claudico;* from the halting gait of some species.

Antennæ

Antennæ ante oculos in fovea laterali capitis insertæ, corporis dimidium longitudine haud superantes, sed capite semper longiores, subclavatæ, undecim-articulatæ (radiculâ exclusâ): articulis 1—3 subcylindricis, primo paulò crassiore, secundo paulò breviore; 4—6 precedentibus sensim paulò brevioribus et apice crassioribus; 7—11 reliquis crassioribus clavam quinque-articulatam subperfoliatam efficientibus: articulo secundo (vel antennarum 8vo) contiguis minori; extimo submucronato, mucrone conico.

Nasus (s. *Clypeus*) haud distinctus, apice truncatus.

Labrum transversum, angustum, apice emarginato-truncatum.

Mandibulæ sub labro dimidiato-absconditæ, corneæ, breves, validæ; basi triangulares, crassæ, latæ, dorso planiusculæ; apice tenuiores, incurvæ, dente acuto adunco terminatæ; margine interiori apice inciso vel denticulato, basi membrana ciliato.

Maxillæ tenues, stipite sub-æquilata, cornea; lobo bipartito: laciniis corneo-membranaceis; *exteriori* lineari apice obliquè truncata; *interiori* paulò breviori sub-triangulari-securiformi, ungue corneo incurvo desinente, margine interiori apice ciliato.

Palpi quatuor inæquales: *exteriores* (s. *maxillares*) longiores, maxillarum dorso innati, exserti, quadriarticulati: articulo primo minutissimo vix conspicuo; secundo multò longiore, versus apicem sensim crassiore, subincurvo; tertio magno, obconico, precedentis ferè longitudine, apice obliquè truncato, cum precedente angulum obtusum efficiente, unde fractus

tus evadit palpus; extimo paulò breviore subulato-conico;—*interiores* (s. *labiales*) sub apice ligulæ a lateribus provenientes, brevissimi, sed lobis ligulæ paulò longiores, sine dissectione vix conspiciendi, tri-articulati: articulis brevissimis longitudine æqualibus, subcylindricis, sensim crassitie decrescentibus; extimo obtuso.

Ligula membranacea, diaphana, sub labio dimidiato-abscondita, apice excisione magna triangulari in lobis duobus subtriangularibus partita.

Labium transversum, trapeziforme-quadratum, acclivè.

Mentum obversè trapeziforme-quadratum labii magnitudine, declivè.

Jugulum (*Gula* Knoch) distinctum, sub-oblongo-quadratum.

TRUNCUS. *Thorax* plerumque transversus, sub-orbiculato-quadratus, anticè pro capitis receptione leviter emarginatus, posticè truncato-sinuatus; plano-convexus, angulis anticis deflexis, marginibus lateralibus rotundatis; apice lateribusque canaliculo marginali tenuissimo, sub lente forti solummodo conspiciendo, circumdatus.

Scutellum triangulare, ad basin laminâ transversâ, angustâ, lævi, nitidâ, sub thorace plerumque delitescente, instructum. Truncus pone scutellum (*Interscapulium* Illig.) sulculo longitudinali exaratus.

Coleoptra oblongiuscula, vel ovata, convexa, thorace haud multò latiora, sed duplò vel triplò longiora; rigidula, integra, abdomen tegentia. Elytra margine exteriori tenui, et striâ juxta suturam impressa; *Epipleura*

*pleura** inflexa, post-pectoris abdominisque latera amplectens, concava, interdum plana, sublineari-lanceolata, a basi ad apicem Elytrorum ferè extendens, vix marginata, rarissimè canaliculo marginali instructa.

Alæ transversè plicatæ, hyalinæ, dimidiato-ovatæ, corpore longiores, neuris tribus vel quatuor validiusculis.

Pectus naviculare: sternum acutè carinatum, concavum, sive segmento circuli dempto, inter coxas pedum anticorum latens.

Post-pectus (*Pectus* Illig.) subgibbosum abdominis longitudine. *Peristethium* subplaniusculum (est ubi in medio acutè carinatum) acumine longo spectante inter coxas intermedias terminatum. *Scapularia* (*Scapula* Knoch) triangulari-trapeziformia. *Mesostethium* subcordato-quadratum, gibbosiusculum, interdum processu apice bifido, inter coxas posticas delitescente terminatum. *Parapleuræ* angustissimè triangulares, cum pleuris in carinulam obtusangulam longitudinaliter coalitæ.

Pedes cursorii, subelongati, graciles, antici intermediis, intermedii posticis breviores†. *Coxæ* approximatæ: anteriores dimidiato-conicæ, femoribus crassiores et breviores; posticæ (*Meriæa* Knoch) transversè lineares supra planiusculæ, subtus convexæ, intus cavæ.

* A term happily suggested by Mr. Kirby to designate the deflexed lateral margin of the elytra so conspicuous in *Blaps*, *Cychrus*, &c. and, if I mistake not, often supplying very valuable subsidiary generic characters.

† I adopt Knoch's very convenient suggestion, and apply the term *anteriores* when the *four fore* feet, *posteriores* when the *four hind* feet, are understood; using *antici*, *medii*, and *postici* for the two fore, two middle, and two hind feet, respectively.

Trochanteres

Trochanteres subtriangulares latere exteriori rotundati, femora suffulcientes: anteriores parvi, minus conspicui; postici plus duplò majores. *Femora* compressa, sublinearia, subinde dimidiato-ovata: antica in fœmina apice tenuiora, in mare plerumque incrassata. *Tibiæ* tenuiores ex triquetro teretiusculæ, a basi ad apicem sensim crassiores, setis rarioribus brevibus apicem spectantibus extus adspersæ, apice interiori bicalcaratæ; anticæ reliquis validiores; intermediæ versus apicem tenuitèr incurvatæ. *Tarsi* setacei, tibiarum ferè longitudine, articulis quinque: primo et extimo longioribus, tribus intermediis subæqualibus; apice ungulati, ungulis binis incurvis. Tarsi antici masculi articulis tribus primis, medii interdum articulo primo, dilatatis.

ABDOMEN subtriangulare, tergo levitèr concavo: segmentis penultimo et ultimo convexiusculis; ventre convexo; segmentis dorsalibus septem, coriaceis, transversis, subæqualibus, ultimo longiore; segmentis ventralibus sex: primo reliquis longiore, basi utrinque obliquè excavato, excavationibus sublanceolatis, pro coxis posticis recipiendis; et inter has plerumque dente uno alterove erectiusculo inter coxas delitescente, instructo. Segmenta sequentia transversa, latitudine sensim decrescentia, extimo minuto acutiusculo.

METAMORPHOSIS nondum innotuit.

VICTUS in fungis, cadaveribus, sub lapidibus, et quisquiliis.

CHOLEVA.

Synopsis Sectionum.

* Antennis subfiliformibus; thorace angulis posticis obtusis. (*Spec.* 1 & 2.)

** Antennis clavatis; thorace angulis posticis acutis; Elytris plerumque obsoletè striatis.

(*Femoribus anticis in mare plerumque apice subincrassatis, tarsis mediis articulo primo dilatato.*)

a Thorace margine basilari prope angulos exciso. (*Spec.* 3—6.)

b ——————————————— recto. (*Spec.* 7—12.)

*** Antennis clavatis; thorace angulis posticis acutis; Elytris haud striatis. (*Spec.* 13—18.)

(*Femoribus anticis in utroque sexu similibus, tarsis mediis articulo primo rarè dilatato.*)

*

1. Choleva *oblonga.*

C. angustato-oblonga, thorace posticè angustiore, medio subfoveolato.

Latr. Gen. Crust. et Ins. ii. 27. 1.

Cistela angustata. *Fab. Ent. Syst.* i. *b.* 46. 25. *Syst. Eleuth.* ii. 20.

Catops elongatus. *Payk. Faun. Suec.* i. 345. 3. *Gyllenhal Ins. Suec.* i. 281. 6.

Ptomaphagus rufescens. *Illig. Käfer Preussens* 87. 1.

Mordella picea. *Marsh. Ent. Brit.* i. 494. 21.

Luperus

Luperus Cisteloides. *Frölich Naturforsch. St.* xxviii. 25. 3. *Tab.* i. *f.* 15.

Carabus rufescens. *Herbst Arch.* v. 139. 49?

Long. Corp. 2½ lin. Lat. ¾ lin.

Habitat ——— *Mus.* D. Marsham, Kirby, Nostr.

DESCR. CORPUS angustato-oblongum, pube parvâ fulvescente obscuratum.

CAPUT nigrum, nitidum, læve. *Labrum Palpi*que pallidè ferruginea. *Mandibulæ* ferrugineæ, latere interiore denticulis 4 vel 5 parvis instructæ. *Antennæ* ferrugineæ, filiformes, apice paulò crassiores, corporis dimidio ferè longiores; articulis longitudine subæqualibus, secundo et octavo reliquis paulò brevioribus exceptis; 2—6 cylindricis apice paulò incrassatis, 7—11 sensim paulò crassioribus ferè obconicis, ultimo lanceolato.

TRUNCUS. *Thorax* plerumque piceus lateribus seu angulis posticis dilutioribus, interdum totus niger sive nigro-piceus; lævis vel obsoletissimè sub lente forti rugulosus; subplanus, quadrato-orbiculatus, longitudinis latitudine, basi apiceque latitudine subæqualis, in medio latior; posticè rectus angulis rotundatis; in medio plerumque obsoletè longitudinaliter foveolatus. *Scutellum* acuminatum, sub lente rugulosum. *Coleoptra* plerumque obscurè rufescentia, interdum nigra, sive nigro-picea, sive picea; sub lente obsoletè rugosa; oblonga, apice obtusè rotundata, thorace triplò longiora et in medio paulò latiora; parum convexa; striis septem obsoletis in singulo Elytro a basi ad apicem excurrentibus, et ut in omnibus, striâ suturali profundiore; paginâ inferiore striis septem punctorum. *Pectus* et *Post-pectus* sub-lævia nigra. *Mesostethium* posticè magìs acutum quàm in reliquis, in processum apice emarginatum productum. *Pedes* ferruginei: posticis elongatis corporis longitudine; femoribus anticis ejusdem formæ in utroque sexu; posticis in mare trochanteribus latere inferiori dente curvato extante, in fœmina inermibus; tarsis mediis articulo primo in utroque sexu filiformi.

ABDOMEN sub-læve, nigrum, segmentis extremo apice pallidioribus.

Var. *β.* flavo-testacea tota, forsan nuper e nymphâ declarata.

No species of the genus can be less easily mistaken than this; and accordingly no doubt attaches to any of the synonyms quoted except that from Herbst.

The unsuspected identity of this species and *Cistela angustata* of

of Fabricius, I accidentally discovered in looking over the Banksian cabinet from which he described that species.

2. Choleva *agilis.*

C. oblongo-ovalis, nigra, supra piceo-brunnea, antennis pedibusque ferrugineis; thorace posticè latiori.

Ptomaphagus agilis. *Illig. Käf. Preus.* 88. 2.
Catops agilis. *Fab. Syst. Eleuth.* ii. 565. 6?
Tritoma dubia. *Fab. Ent. Syst.* i. b. 506. 5?
Catops fuscus. *Gyll. Ins. Suec.* i. 281. 5.
Helops fuscus. *Panz. Faun. Germ.* 18. 1??
Long. Corp. 2¼ lin. Lat. 1¼ lin.
Habitat ——— *Mus.* D. Kirby, Wilkin, β. nostr.

DESCR. CORPUS paulò brevius et latius quàm in precedente, pube griseo-fulvescente paulò densiori, sub lente obsoletè rugulosum.

Caput nigro-piceum, læve. *Labrum Mandibulæ Palpi*que flava. *Antennæ* ferrugineæ, apice saturatiores, eâdem ferè structurâ ut in precedente, sed articulis paulò brevioribus et crassioribus.

Truncus. *Thorax* piceo-brunneus, disco saturatiore; sub-convexus, ex transverso subquadratus, longitudine paulò latior, ab apice ferè ad basin sensim dilatatus, sed apud basin ipsam iterum paulò angustatus, ita, tamen, ut basis latior quàm apex maneat; posticè rectus, angulis obtusis rotundatis. *Scutellum* subacuminatum. *Coleoptra* ovato-oblonga, apice obtusè rotundata, thorace ferè triplò longiora, piceo-brunnea, striis septem obsoletis in singulo Elytro a basi ad apicem excurrentibus, quàm in precedente obsoletioribus. *Pectus* et *Postpectus* piceo-nigra. *Pedes* ferruginei.

Var. β. flavo-testacea tota. An specimen immaturum?
Choleva testacea. *Latreille Gen. Crust. et Ins.* ii. 26. 2.

Illiger, Latreille and Gyllenhal are the only authors to whom I can refer with confidence as having described this species. I have little doubt that it is the former's *Ptomaphagus agilis,* with the

the description of which in the main it very well agrees. The only discordance is in the character given to the posterior angles of the thorax, which he calls acute. He quotes as synonymous *Tritoma dubia* of Fabricius, and I have therefore inserted this reference; but Fabricius's description is too brief to give certainty as to the identity of his species with ours. Certainly *C. agilis* of Panzer, which Panzer calls *C. agilis* Fab., is a very different insect; belonging to the last section of this monograph, only 1½ line long, with antennæ shorter than the thorax.

Latreille's description very well suits the flavo-testaceous immature variety, if we suppose, as is most probable, that the male is furnished with toothed hind trochanters, and that this was the sex he had before him. He synonyms with his species, but in doubt, Panzer's *Helops fuscus* 18. 1. and there is certainly some resemblance; but the latter is figured with the basal margin of the thorax sinuate on each side; which will by no means apply to *C. agilis.*

* * a

3. CHOLEVA *nigricans.*

C. oblongo-ovalis, nigra, antennis thorace longioribus, pedibusque, ferrugineis.

Luperus niger. *Frölich Naturforsch.* 28. 23. 1. *Tab.* i. *fig.* 17?

Dermestes fornicatus. *De Geer Mem.* iv. 216. 9. *Tab.* viii. *fig.* 15?

Long. Corp. 2½ lin. Lat. 1¼ lin.

Habitat ——— *Mus.* D. J. Hooker, Wilkin. β. D. Kirby. γ. D. Kirby, Wilkin.

DESCR. CORPUS oblongius quàm in reliquis hujus familiæ; nigrum, obsoletè rugulosum, pube griseo-fulvescente vestitum.

CAPUT sub lente subtilitèr punctatum: punctis confertis, distinctis. *Palpi* ferruginei. *Antennæ* ferrugineæ apice interdum fuscescentes, sub-clavatæ, thorace paulò longiores; articulis 2—6 obconico-cylindricis subæqualibus, 7—11 precedentibus sensim

sensìm crassioribus, 8vo contiguis paulò breviori et angustiori, extimo reliquis crassiore globoso-ovato, apice obtusè mucronato.

TRUNCUS. *Thorax* ex transverso quadratus, longitudine paulò latior, margine basali in medio parum rotundato, ad angulos utrinque distinctè exciso. *Coleoptra* thorace plus duplò longiora et paulò latiora, obsoletè striata, striis a basi ad apicem excurrentibus. *Pedes* piceo-ferruginei.

Var. β. piceo-brunnea, labro, antennis, pedibusque ferrugineis.
Mordella cicatricata. *Marsh. Ent. Brit.* 495. 23.

γ. flavo-testacea, capite obscuriore; an nuper e nymphâ declarata?

I have referred De Geer's *Dermestes fornicatus* to this species, rather than, as is usually done, to *C. tristis* of this paper, because both his figure, and his description of the antennæ, which he calls longer than the head and thorax, are much more applicable to the former than to the latter.

4. CHOLEVA *sericea.*

C. ovata, gibboso-convexa, fusco-picea, antennis thorace paulò longioribus, pedibusque, piceo-ferrugineis.

Catops sericeus. *Payk. Faun. Suec.* i. 342. 1. *Fab. Syst. Eleuth.* ii. 564. 2?

Tritoma sericea. *Fab. Ent. Syst. em.* i. *b.* 507. 8? *Herbst Col.* iv. 196. 6?

Luperus fuscus. *Frölich Naturf.* xxviii. 24. 2. *Tab.* i. *fig.* 16?

Long. Corp. 2¼ lin. Lat. 1⅓ lin.

Habitat ——— *Mus.* Nostr.

DESCR. CORPUS quàm in congeneribus latius et convexius, precedente brevius, pube tenui adpressâ fulvescente glaucâ griseâve versicolore vestitum; sub lente (pube abrasâ) obsoletè rugulosum.

CAPUT sub lente distinctè et confertìm punctulatum. *Palpi* piceo-ferruginei. *Antennæ* ferrugineæ basi apiceque dilutiores, thorace paulò longiores; structurâ fere eâdem ut in precedente, sed paulò breviores et ad apicem paulò tenuiores.

TRUNCUS.

Truncus. *Thorax* quadrato-transversus longitudine tertiâ parte latior, anticè ferè dimidio angustior quàm posticè, basi rectior quàm in precedente truncatus, excisionibus levioribus. *Coleoptra* thorace plus duplò longiora et in medio dimidio latiora, pone medium latissima, obsoletissimè striata, striis sub lente a basi ad apicem excurrentibus.

Var. β. flavo-testacea tota; an nuper e nymphâ declarata?

The antennæ of this and the preceding are of a conformation intermediate between that of the antennæ of *C. oblonga* and *agilis*, and of the remaining species of this family; the fifth and sixth joints not being so distinctly shorter than the third and fourth as in the next two species; the eighth joint not so evidently less than the ninth, and the club of the antennæ not so distinctly formed. I have not seen the male of this insect.

I have little hesitation in quoting Paykull's *Catops sericeus* as synonymous with this species, although it has generally been referred to the next. His description for the most part accords much better with this than with that, or indeed with any other of the genus. His omission to notice the small eighth joint of the antennæ, may be easily accounted for in describing this species, in which that part is not much more distinctly less than in *C. oblonga*, where also he has overlooked it. The thorax, though contracted just at the base as in all the rest of this section, is yet, as he describes it, in this species, nearly twice as wide there as at the apex, which is by no means the case in the next. But the characters in his description which most indisputably fix the identity of the two insects are those given of the elytra— "*anticè valdè convexa, gibba, latitudine vix dimidio longiora.*" These will suit no other species, but are, if we refer the convexity to the middle rather than the base of the elytra, very applicable to this. The only incongruity in his description is the obscure testaceous colour attributed to the elytra, which in my insect are

of

of the same colour as the rest of the body: but this difference is of little moment in so variable a genus.

The references to Fabricius and to Herbst are adopted on the authority of Paykull. The characters given by the former are too brief to decide by; and the latter seems merely to have copied Fabricius. The figure of Frölich's *Luperus fuscus*, as well as his description in which he characterizes that as "*kleiner und mehr buchlicht*" than the foregoing, (his *L. niger*,) appear to be intended for this species.

5. CHOLEVA *tristis.*

C. oblongo-ovalis, nigra, antennis basi, tibiis, tarsisque ferrugineis; capite anticè abbreviato.

Latreille Gen. Crust. et Ins. ii. 28. 3.

Ptomaphagus fornicatus. *Illig. Käf. Preus.* i. 89. 3.

Dermestes fornicatus. *Rossi Faun. Etrusc.* 352. 31?

Catops Morio. *Payk. Faun. Suec.* i. 344. 4. *Fab. Syst. Eleuth.* ii. 564. 4?

Mordella clavicornis. *Forst. Cent.* 66. *Marsh. Ent. Brit.* i. 494. 22.

Cistela ovata. *Oliv. Ent.* iii. 54. 10. 12. *Tab.* i. 11. *a. b*?

Helops tristis. *Panz. Faun. Germ.* 8. 1. *Ent.* i. 43. 9.

Chrysomela gibbosa. *Thunberg. Nov. Act. Ups.* iv. 14. 24.

Tritoma Morio. *Fab. Ent. Syst. em.* i. 507. 7?

Catops fornicatus. *Gyll. Ins. Suec.* i. 276. 1.

Long. Corp. 1¾—2 lin. Lat. 1¼ lin.

Habitat ——— *Mus.* D. Marsham, Wilkin, Nostr.

DESCR. CORPUS oblongo-ovale, nigrum, pube fulvescente quàm in precedente rariori vestitum; sub lente obsoletè rugulosum.

CAPUT sub lente levitèr et crebrè punctatum, ante antennas brevius quàm in duabus precedentibus. *Palpi* ferruginei. *Antennæ* thoracis longitudine, articulis 4, 5, vel 6 primis, ferrugineis, reliquis nigro-fuscis; articulo 8vo contiguis ferè dimidiò breviore et angustiore.

TRUNCUS.

TRUNCUS. *Thorax* transverso-sub-quadratus, longitudine paulò latior, basi apiceque latitudine subæqualis. *Coleoptra* thorace vix latiora sed plus duplò longiora, striis obsoletissimis a basi usque ad apicem decurrentibus, apice rotundata sed magis acuta quàm in precedente. *Pedes* rufo-ferruginei; interdum nigro-picei, tibiis tarsisque rufo-ferrugineis; in mare femoribus anticis apice incrassatis, tarsis mediis articulo primo dilatato.

If the preceding species can be best referred to Paykull's *Catops sericeus,* there is equal reason to believe that the present is his *C. Morio,* which he characterizes as more oblong than that, its thorax narrower, and nearly as broad before as behind; the antennæ with a minute eighth joint; the elytra less convex, "*thorace plus quam dimidio longiora;*" the thighs fuscous; and, lastly, almost one half less in size.

The synonyms quoted from Illiger, Latreille, and Panzer are liable to little or no doubt. The magnified figure which the latter has given of the head and antennæ of his *Helops tristis* aptly represents those parts in this species, the fore part of the head being shorter than is common in this family, just as he has figured it. I refer to Fabricius on the authority of Paykull. His description of *C. Morio* suits neither this species nor any other of the genus: for I know not one with wholly black antennæ.

6. CHOLEVA *festinans.*

C. oblongo-ovata nigra, antennis basi, labro, elytris, pedibusque rufo-testaceis; thorace anticè angustiore.

Long. Corp. 2 lin. Lat. $1\frac{1}{8}$ lin.

Habitat ——— *Mus.* D. Kirby.

DESCR. CORPUS oblongo-ovatum, pube fulvescente densiori quàm in precedente, vestitum, sub lente, pube abrasâ, obsoletissimè rugulosum.

CAPUT sub lente punctulatum. *Labrum Palpi*que ferruginea. *Antennæ* ferè ut in precedente, sed paulò breviores, articulis 6 primis ferrugineis, reliquis fuscis.

Truncus. *Thorax* nigro-fuscus, ad margines fusco-testaceus, transversus, brevior et anticè angustior quàm in precedente, margine basilari utrinque ad angulos magis levitèr exciso. *Coleoptra* rubricosa (sive rufo-testacea) thorace triplò ferè longiora et paulò latiora, striis obsoletis, sed a basi usque ferè ad apicem ductis. *Pedes* rufo-ferruginei.

Abdomen sublæve, segmentis ventralibus apice brevissimè ciliatis; ano parum rufescente.

From the preceding, the only species with which it is likely to be confounded, this differs in colour; in having the thorax shorter in proportion to its width, narrower before, and the excisions at the angles more obsolete; and the elytra more densely clothed with pubescence.

* * b.

7. Choleva *chrysomeloides.*

C. oblongo-ovalis, nigra, antennis basi, tibiis, tarsisque rufobrunneis; antennis *fœmineis* fusiformi-clavatis, crassis: articulo extimo ovato, contiguis longiore.

Latr. Gen. Crust. et Ins. ii. 29. 4.

Helops chrysomeloides. *Panz. Faun. Germ.* 57. 1.

Long. Corp. $2\frac{1}{2}$ lin. Lat. $1\frac{1}{4}$ lin.

Habitat ——— *Mus.* D. Kirby, Watson, Wilkin, Nostr. *β.* D. J. Hooker.

DESCR. CORPUS ovale, nigrum, pube densâ griseo-fulvescente holosericeum, sub lente, pube abrasâ, subtilissimè punctato-rugulosum.

Caput confertissimè punctulatum. *Palpi* rufo-brunnei. *Mandibulæ* latere interiori sub apice emarginato vel unidentato. *Antennæ* in *fœmina* subfusiformes, crassæ, thorace tertiâ parte breviores, in mare paulò tenuiores longiores; basi rufobrunneæ; articulis 1—3 subæqualibus obconicis: 2do contiguis paulò breviore; 4—6 turbinatis, precedentibus dimidio brevioribus; 7, 9 et 10 sub-pateræformibus; 8vo contiguis triplò breviore et multò angustiore; extimo precedente ferè duplò longiore, articuli tertii longitudine, ovato.

Truncus. *Thorax* subquadratus, longitudine paulò latior, lateribus rotundatis, ad angulos posticos subrectis; margine basilari subrecto, excisionibus apud angulos nullis,

nullis, sed medio utrinque levissimè sinuato. *Alæ* apice fuscæ. *Coleoptra* oblongo-ovata, thorace ferè triplò longiora et in medio paulò latiora, pube derasâ, obsoletissimè striata. *Pedes* nigri, femoribus anticis apice, tibiis, tarsisque, rufo-brunneis.

Var. *β*. griseo-fusca, capite thoracisque disco obscurioribus; thorace pube fulvescente, elytris, grisescente, vestitis. An species distincta?

Of this species I have seen two or three specimens of each sex. They exhibit no other than the usual sexual differences. The females are slightly larger, and their antennæ a little thicker and longer.—There can be no danger of confounding this with any species of the two preceding sections. In habit it approaches nearest to *C. tristis*; but the resemblance is superficial merely, there being a wide difference in the form and structure of the antennæ and thorax, as the description of each has indicated.—The elytra of this insect have no appearance of striæ except the pubescence is scraped off, when a few faint traces are generally to be observed.—The antennæ vary with respect to the colour of the base. In some only the base of the first joint is reddish brown; in others the two first joints, and in one specimen the first six joints, were wholly of this colour.—In the female they are thicker than in any other species of the genus.—The lateral margins of the thorax are rounded from the apex almost to the base, but close to the base they are nearly straight and parallel. To see this character a microscope and a keen eye are requisite, especially if the thorax be clothed with the usual thick pubescence.

Panzer's figure appears to be intended for this species, though neither the antennæ nor the basal margin of the thorax are correctly drawn, and the feet are coloured wholly yellow.—Latreille's

 description

description leaves no doubt as to the correctness of the reference to him.

8. Choleva *Leachii.*

C. ovalis nigra, antennis basi, tibiis, tarsisque, rufo-brunneis; antennis clavatis: articulo extimo brevi, mucronato; capite anticè abbreviato.

Long. Corp. 2¼ lin. Lat. 1¼ lin.

Habitat ——— *Mus.* D. Leach, Watson, Wilkin.

Precedentis descriptio huic speciei applicari potest, differentiis sequentibus exceptis. *Antennæ* tenuiores, basi rufo-brunneæ, apice sub-fuscescentes; articulis sex ultimis pateræformi-turbinatis; extimo haud ovato contiguis angustiore et duplò longiore, sed globoso-ovata mucronata, illis subæquali. *Caput* quàm in precedente minus, ante antennas brevius. *Elytra* respectu thoracis breviora.

The characters which separate this species from the preceding are not very obvious, but sufficiently constant, as a narrow examination of not fewer than twelve specimens, ten of which were supplied by my friend Dr. Leach, F.L.S., whose name it bears, has proved, to constitute it perfectly distinct.

9. Choleva *Kirbii.*

C. obovata fusca, pedibus dilutioribus, antennis basi ferrugineis, articulis ultimis transversis; elytris apice acutis.

Long. Corp. 1⅞ lin. Lat. 1 lin.

Habitat ——— *Mus.* D. Kirby, Nostr. *β.* D. Kirby.

DESCR. CORPUS obovatum, fuscum, pube grisescente vestitum, sub lente, pube detritâ, obsoletè rugulosum.

Caput punctulatum. *Labrum Palpi*que ferruginea. *Antennæ* articulis quinque primis ferrugineis, reliquis fuscis; clavatæ, thoracis ferè longitudine, structura ut in precedente.

Truncus. *Thorax* quadrato-subtransversus lateribus rotundatis sed ad angulos posticos subrectis; posticè rectus sine ullâ excavatione apud angulos, sed medio utrinque levitèr sinuatus. *Coleoptra* thorace duplò longiora et in medio paulò latiora,

latiora, apice quàm in precedente acutiora, sine ullis, vel apice obsoletissimis solunmodo, striarum vestigiis.

Var. *β.* nigra, elytris rubellis, antennis basi tibiis tarsisque ferrugineis. Femora antica ad apicem incrassata. Tarsi antici et mediorum articulus primus dilatati. An varietas sexus?

This species has precisely the same habit as the foregoing. It differs from it in colour, size, in having the thorax more distinctly narrowed behind, the elytra in proportion to the thorax broader, and somewhat more acute at the apex. The body, too, is shorter in proportion to its breadth, and its outline obovate rather than oval. The head, as in the preceding, is proportionally shorter than in *C. chrysomeloides*, and the antennæ thinner, with their last joint shorter and more distinctly mucronate.

I have seen but two specimens of this insect; one from the rich cabinet of my excellent friend the Rev. William Kirby, B.A. F.L.S., by whose name I have designated it; the other in my own. That in Mr. Kirby's cabinet has its antennæ wholly ferrugineous, but differs in no other respect, and this variation is probably accidental. I cannot positively satisfy myself whether or not the apex of the elytra has any vestige of striæ. When the pubescence is removed, there seemed, in some lights, to be one or two very obsolete lines.

10. CHOLEVA *Marshami.*

C. oblongo-ovalis, fusca, antennis, thoracis longitudine, pedibusque, flavo-ferrugineis; elytris apice obtusiusculis.

Long. Corp. $2\frac{1}{4}$ lin. Lat. 1 lin.

Habitat ——— *Mus.* D. Marsham, Nostr.

DESCR. CORPUS oblongo-ovale fuscum, pube griseo-flavescente vestitum, sub lente, pube derasâ, punctato-rugulosum.

CAPUT

Caput nigrum, sub lente punctatum. *Labrum Palpi*que flavo-ferruginea. *Antennæ* flavo-ferrugineæ, medio saturatiores, subclavatæ, thoracis longitudine, seu illo paulò longiores; articulis 4—6 obconico-cylindricis, reliquis sensim crassioribus turbinatis; 8vo contiguis dimidio minori, extimo ovato.

Truncus. *Thorax* transverso-sub-quadratus longitudine vix latior, lateribus rotundatis (haud ad angulos posticos subrectis), posticè rectus sine ullâ excisione. *Coleoptra* thorace vix latiora, sed plus duplò longiora, interdum apud apicem obsoletissimè striata, apice obtusiuscula. *Pedes* flavo-ferruginei femoribus anticis in utroque sexu similibus, apice vix attenuatis.

Var. *β.* Picea tota, antennis pedibusque ferrugineis.

Of this insect I have seen but two specimens, which chanced to be the sexes—the female in the cabinet of my kind friend Thomas Marsham, Esq. V.P.L.S., after whom I have named the species; the male in my own. The fore thighs of the latter are not incrassated at the apex, as in the males of the preceding species, and it is a shade or two lighter in colour than the female. This difference and the usual sexual distinctions in the tarsi excepted, the sexes are precisely similar.

11. Choleva *Dissimulator.*

C. ovalis, nigra, antennis thoracis longitudine basi apiceque, tibiis, tarsisque, rufo-ferrugineis.

Long. Corp. 2 lin. Lat. 1 lin.

Habitat ——— *Mus.* D. Watson ♂. Leach ♂. ♀.

DESCR. CORPUS oblongo-ovale, nigrum, pube densâ fulvescente-griseâ vestitum, supra, sub lente, pube derasâ, rugulosum.

Caput sub lente punctatum. *Palpi* rufo-ferruginei. *Antennæ* structura ut in precedente, thoracis longitudine, fuscæ, articulis duobus primis extimoque ferrugineis. *Thorax* subquadrato-transversus longitudine paulò latior, lateribus ab apice ad basin ut in precedente rotundatis; posticè rectus sine ullâ excavatione. *Coleoptra* thorace paulò latiora et duplò longiora, striis nullis. *Pedes* antici (coxis nigris exceptis) rufo-ferruginei; posteriores nigri: tibiis tarsisque rufo-ferrugineis.

Var.

Var. β. nigro-fusca, coxis anticis rufo-ferrugineis. L. C. $1\frac{3}{4}$ lin. Mus. D. Leach.

This in its general habit, and in the form of its thorax, which is rounded at the sides from the apex to the base, and straightly truncate behind, agrees with the preceding. It differs from it in colour, and in having its thorax more transverse, and appears a distinct species. The present section, if more species belonging to it should be discovered, will admit of a further very natural separation into two other smaller divisions; one including *C. chrysomeloides, Leachii, Kirbii,* and those akin to them which have the sides of the thorax parallel or sub-recurved just at the base; and the other comprising those which, like the present species, and *C. Marshami,* have the sides rounded from the base to the apex.

This insect affords a striking example of the necessity of attending in these obscure genera to minute characters, such as those upon which the families are here separated. In colour and general appearance it so exactly resembles *C. tristis,* that an entomologist not versed in the genus would decidedly pronounce them the same; which, in fact, at first I considered them. Upon a more careful examination, however, and on separating the thorax from the coleoptra, which is often the only way to get a clear idea of its basal outline, the difference between the two species was abundantly manifest; this being without the slightest trace of the lateral excisions which in that are so obvious. Other distinctions too exist. The fore part of the head is longer; the antennæ are longer and slightly thicker at the apex; and the body, when closely compared, narrower.

* * *

12. CHOLEVA *villosa.*

C. quadrato-oblonga, supra striis levissimis transversè acuducta; elytris apice subtruncatis.

Latr. Gen. Crust. et Ins. ii. 29. 5.

Choleve soyeuse. *Latr. Hist. Nat. des Crust. et Ins.* ix. 251.

Catops truncatus. *Gyll. Ins. Suec.* i. 279. 3.

Ptomaphagus truncatus. *Illig. Magazin für Insektenkunde* i. 42. 4.

Mordella silphoides. *Marsh. Ent. Brit.* i. 493. 19.

Mycetophagus picipes. *Kugellan Schneid. Mag.* 558. 9.

Helops dermestoides. *Panz. Faun. Germ.* 57. 2?

Helops sericeus. *Panz. Faun. Germ.* 73. 10?

Dermestes. *Linn. Faun. Suec. Edit.* 1746. *no.* 371. *Edit.* 1761. *no.* 2268?

Le Bouclier brun velouté. *Geoff. Hist. des Ins.* i. 123?

Peltis villosa. *Fourcroy Hist. Ins. Par.* 1. 32?

Long. Corp. $\frac{3}{4}$—$1\frac{1}{2}$ lin. Lat. $\frac{1}{2}$—$\frac{3}{4}$ lin.

Habitat ——— *Mus.* D. Marsham, Kirby, Nostr.

DESCR. CORPUS nigrum, sub lente, pube derasâ, subtilissimè transversè acuductum; subquadrato-oblongum, anticè paulò latius, pube densâ grisescente vestitum.

CAPUT sublæve. *Labrum Palpique* ferruginea, interdum nigra. *Mandibulæ* latere interiori sub apice exciso vel unidentato. *Antennæ* clavatæ, basi ferrugineæ apice nigro-fuscæ, thorace tertiâ parte breviores; articulis 1—3 subcylindricis, 4—6 brevioribus turbinatis, 7—10 pateræformibus, transversis, 8vo contiguis triplò breviore et paulò angustiore, extimo ovato acuto.

TRUNCUS. *Thorax* subquadratus, longitudine paulò latior, convexus, lateribus anticè subcompressis posticè subrectis, margine basali recto, ad angulos utrinque excisione levi. *Coleoptra* nigra, sive picea, interdum testacea, reliquo corporis magis distinctè et obliquè acuducta, thorace paulò angustiora, et ferè triplò longiora, lateribus subrectis, a basi ad apicem sensim paulò angustata, apice obliquè truncata, angulis exterioribus rotundatis; striis (suturali marginalique exceptis) nullis.

Pedes

Pedes nigri, tibiis tarsisque plerumque nigro-fuscis sive piceis: *antici:* coxis magnis femorum longitudine; femoribus margine interiori apice constricto; tibiis femorum ferè longitudine, validis, clavatis, apice valdè incrassatis;—*posteriores:* femoribus oblongo-ovalibus, margine exteriori rotundato, interiori subrecto; tarsis mediis in utroque sexu similibus.

Var. β. Elytris rubellis.

Var. γ. Elytris pedibusque pallidè testaceis.

Exclusive of the sectional distinctions which separate this from the preceding species, it may at once be known from them, as well, indeed, as from all here described, by its oblong-square nearly parallel-sided body, transversely acuducted surface, and subtruncate elytra. Of these the greatest peculiarity, which, however, is not visible but through a powerful lens when the pubescence is removed, is the fine, thickly-set, needle-drawn striæ, considerably analogous to those which are found on *Dyticus striatus* Ent. Brit. which cover more or less the whole surface.

Another peculiarity which distinguishes this and some of the following species from those of the preceding sections, is the relative shortness of the fore thighs, which in the former are barely longer than the coxæ; whereas, in the latter, they are twice as long, or at least half as long again.

In size no other species is so variable as this; the largest specimens being nearly a line longer than the smallest, with individuals intermediate. The pubescence varies in regard to its tint of colour and thickness. In some specimens the first two joints only of the antennæ are ferrugineous; in others the first four or five. In some the feet are wholly piceous or testaceous; in others the tibiæ and tarsi, or tarsi only. The elytra vary from black to piceous, dull red, and pale testaceous. No specific distinction can be drawn from any of these variations. In the unchangeable attributes of form and sculpture all the

the individuals agree, and constitute therefore in reality but one species.

No species of the genus has been so frequently described as this. Of the correctness of the synonyms quoted from Illiger, Marsham, Kugellan, and Latreille, there is no question. The remainder are less certain. With Illiger, I have doubtfully referred to Panzer's *Helops dermestoides* and *sericeus.* The general habit, clavate antennæ, and truncate elytra of the former suit very well; but the elytra are figured broader than the thorax, and punctate; both which characters are at variance with our species. *H. sericeus* in the colour of its elytra and the outline of the body would tolerably suit var. γ: but the antennæ are too thin at the apex, and the elytra are punctate, and at the apex too much rounded. If these two be correctly figured, they are species not here described, though belonging to this section.

I am indebted to Mr. Kirby for pointing out the probability that *Dermestes no.* 371 of the first edition of *Fauna Suecica* is synonymous with this species. Major Gyllenhal has, with I think less plausibility, referred it to *C. tristis.* In the Linnean cabinet there is not, as Mr. Kirby informs me, any specimen of *Choleva* extant.

13. CHOLEVA *velox.*

C. ovalis fusco-cinnamomea, capite nigro, antennis subclavatis, thoracis longitudine, pedibusque dilutioribus.

Catops agilis. *Panz. Faun. Germ.* 95. 10 ?

Long. Corp. 1⅓ lin. Lat. ⅔ lin.

Habitat ——— *Mus.* D. Kirby, Wilkin, Nostr.

DESCR. CORPUS ovale, lateribus quàm in precedente rotundioribus, supra cinnamomeum sive fusco-ferrugineum, subtus saturatius, pube flavo-grisescente, sub lente forti, pube derasâ, obsoletissimè transversè acuducto-rugulosum.

CAPUT

Caput nigrum sublæve. *Labrum Palpi*que ferruginea. *Antennæ* ferrugineæ, thoracis longitudine, sub-clavatæ, apice multò minùs incrassatæ quàm in precedente; articulis subcylindricis, subæqualibus, sensim crassioribus, 8vo contiguis vix dimidio breviore, extimo subovato.

Truncus. *Thorax* disco interdum nigricante; transverso-subquadratus, quàm in precedente convexior, longitudine dimidio latior; margine postico subrecto, apud angulos inconspicuè et latè exciso. *Coleoptra* thorace duplò longiora, et in medio paulò latiora, apice rotundata. *Pedes* ferruginei: *antici:* femoribus coxis paulò longioribus lanceolato-ovatis, apice in utroque sexu attenuatis; —— *posteriores:* femoribus sub-linearibus; tarsis mediis in utroque sexu filiformibus.

Var. β. rufo-ferruginea tota.

While this species agrees with the foregoing in having the same formed thorax, and something of the same acuducted transverse striæ, it differs from it in colour, in having a more rounded body and elytra round at the apex; and from it, as well as the following species, in the structure of its antennæ, which are longer, much thinner at the apex, barely clavate, the five last joints scarcely turbinate, and the eighth but slightly differing either in length or breadth from the rest of the club. The transverse aciculations are much more crowded, fainter, and less distinct than in *C. villosa*, partaking in some degree of the slightly elevated rugæ common to the species of the first and second sections.

14. Choleva *fumata.*

C. oblongo-ovalis, nigra, antennis thoracis longitudine, basi, elytris pedibusque obscurè rufo-ferrugineis.

Catops agilis. *Gyll. Ins. Suec.* i. 279. 3.

Cistela fusca. *Oliv. Ent.* iii. 54. 10. 13. *Fab.* 1. *fig.* 14. *a. b* ?

Long. Corp. 1½ lin. Lat. ⅝ lin.

Habitat —— *Mus.* D. Watson, Wilkin.

DESCR. CORPUS exactè oblongo-ovale, nigrum, pube densâ fusco-griseâ vestitum, sub lente, pube derasâ, rugulosum.

CAPUT sublæve. *Palpi* rufo-ferruginei. *Antennæ* fuscæ, articulis duobus vel tribus primis rufo-ferrugineis; magìs quàm in precedente clavatæ, thoracis ferè longitudine; articulis quinque ultimis subturbinatis, 8vo contiguis dimidio breviore.

TRUNCUS. *Thorax* transversè subquadratus, longitudine paulò latior, margine postico subrecto, apud angulos inconspicuè et latè exciso. *Coleoptra* obscurè fusco-rufescentia, thorace duplò et dimidio longiora et ejus latitudine, apice rotundata. *Pedes* rufo-ferruginei.

For regarding this species, which is very distinct from the preceding, as *Catops agilis* of Gyllenhal, I have the authority both of his excellent description, and of a Swedish specimen sent me by my kind correspondent Mr. Schönherr, of Stockholm, author of the valuable *Synonyma Insectorum.*

15. CHOLEVA *Watsoni.*

C. oblongo-ovalis, nigra, antennis crassis thorace brevioribus, basi, elytris, pedibusque rufo-brunneis; thorace brevissimo.

Long. Corp. $1\frac{1}{3}$ lin. Lat. $\frac{5}{8}$ lin.

Habitat ——— *Mus.* D. Watson.

DESCR. CORPUS nigrum, oblongo-ovale, pube subdensâ griseo-fulvescente; sub lente, pube derasâ, punctato-rugulosum.

CAPUT sub lente sub-punctatum. *Labrum* fusco-ferrugineum. *Palpi* ferruginei. *Antennæ* fuscæ, articulis tribus primis rufo-brunneis, extimo pallido; crassiores quàm in duobus precedentibus, thorace ferè tertiâ parte breviores, structura ferè ut in *C. truncatâ.*

TRUNCUS. *Thorax* niger, angulis posticis obscurè rubentibus, quadrato-transversus, longitudine duplò latior, margine postico subrecto, apud angulos vix exciso. *Coleoptra* rufo-brunnea, thorace triplò longiora et paulò latiora, apice subacuta. *Pedes* rufo-brunnei, anticis (coxis exceptis) dilutioribus.

In colour this does not much differ from the preceding, but is furnished with other characters strikingly distinctive. The antennæ are shorter and thicker, almost precisely the shape and structure of those of *C. villosa*; with which, indeed, were it not for its round apexed elytra and rugulose surface, it might be confounded. The thorax is very short, being at least twice as broad

broad as long; in fact, it is proportionably shorter than in any species of the genus. And the coleoptra, which are three times longer than the thorax, are more acute at the apex than in *C. fumata*.

Having seen but one specimen of this insect, which stands in the cabinet of my friend and neighbour P. W. Watson, Esq., an acute entomologist, with whose name I have designated it, I am unable to speak as to the constancy of the colour of the elytra; but as they are not of the pale shade of immature specimens, but of a dark red ochre tinge, there is no reason to suppose that they vary materially.

16. CHOLEVA *anisotomoides*.

C. ovalis, convexa, nitida, subpilosa, fusco-picea, antennis pedibusque pallidè ferrugineis; thorace posticè recto.

Long. Corp. $\frac{9}{8}$ lin. Lat. $\frac{1}{2}$ lin.

Habitat sub foliis putridis. *Mus.* D. Kirby, Wilkin, Nostr.

DESCR. CORPUS nitidum, ovale, fusco-piceum, precedentibus convexius, habitu *Phalacri* vel *Anisotomæ*, pilis raris brevibus grisescentibus vestitum.

CAPUT nigro-piceum, sublæve. *Labrum Palpi*que ferruginea. *Antennæ* dilutè flavescentes thoracis longitudine, sub-capitato-clavatæ, articulis duobus baseos subæqualibus reliquis paulò longioribus; 3tio illis breviore sed sequente paulò longiore; 4—6 subovali-cylindricis; reliquis turbinatis magnitudine sensim paulò crescentibus; 8vo contiguis ferè dimidio minore; ultimo magno, subgloboso submucronato.

TRUNCUS. *Thorax* margine postico plerumque dilutiori, sublævis, sub-quadrato-transversus, anticè angustior, longitudine ferè duplò latior, margine postico recto, sine excisione ullâ. *Coleoptra* ovata, convexa, sub lente vagè rugulosa, thorace duplò longiora et paulò latiora. *Pedes* pallidè ferruginei: antici femoribus in utroque sexu apice attenuatis, coxis vix longioribus.

Var. β. pallidè testacea tota.

The most distinguishing characteristics of this species are the straightly truncate hinder margin of the thorax, and the more than ordinary convexity of the body, which is such as to give it in some degree

degree the habit of an *Anisotoma* or *Phalacrus* (*Dermestes fimetarius, politus, &c.* Ent. Brit.). The antennæ have nearly the structure of those of *C. velox*, but they approach almost to capitato-clavate; the first two joints seem more distinctly longer than the third; and the eighth is rather more obviously less than the seventh and ninth than in that. The pubescence approaches more to the character of pili than in the other species.

17. Choleva *Wilkinii.*

C. oblonga, fusco-picea, antennis pedibusque flavo-ferrugineis; thorace posticè recto.

Long. Corp. 1¼ lin. Lat. ½ lin.

Habitat ——— *Mus.* D. Wilkin.

DESCR. CORPUS oblongum, vel sublineare, fusco-piceum, pube brevissimâ grisescente vestitum.

Caput sublæve. *Palpi* flavo-ferruginei. *Antennæ* flavo-ferrugineæ thoracis longitudine, structura ut in precedente.

Truncus. *Thorax* sublævis ferè ut in precedente conformatus, margine postico recto. *Coleoptra* oblonga lateribus subrectis, sub lente rugulosa, thorace pauló angustiora et ferè triplo longiora, apice rotundata. *Pedes* flavo-ferruginei: antici femoribus in utroque sexu apice attenuatis.

In colour this very distinct species, which I have seen only in the cabinet of my friend S. Wilkin, Esq. F.L.S., whose name it bears, has at first sight considerable resemblance to *C. velox*; but is at once distinguished from that by its proportionally much longer and narrower body, which also well distinguishes it from the preceding, with which it agrees in the structure of its antennæ and thorax.

18. Choleva *brunnea.*

C. oblongo-obovata, nigro-brunnea, antennis articulo 8vo contiguis æquali, extimo obtuso.

Mylæchus brunneus. *Latr. Gen. Crust. et Ins.* ii. 30. 1. *tab.* 8. *fig.* 11.

Catops

Catops brevicornis. *Payk. Faun. Suec.* i. 140. 4. *Gyll. Ins. Suec.* i. 280. 4.

Hallominus testaceus. *Panz. Faun. Germ.* 57. 23?

Long. Corp. 1 lin. Lat. ½ lin.

Habitat ——— *Mus.* D. Watson, Nostr.

DESCR. CORPUS nigro-brunneum, oblongo-obovatum, pilis flavescenti-griseis vestitum, subtilitèr vagèque rugulosum.

CAPUT nigrum, collo haud constrictum. *Labrum Palpi*que structura ut in precedentibus, ferruginea. *Antennæ* fusco-ferrugineæ basi apiceque dilutiores, subincurvæ, thorace dimidio breviores, apice valdè incrassatæ; articulis duobus baseos sequenti paulò crassioribus et longioribus, ovali-cylindricis; tertio subobconico; 4—7 precedenti brevioribus, obconicis, sensim crassioribus; 8—10 transversis, æqualibus, precedentibus duplò crassioribus; extimo contiguis paulò longiori et angustiori obtuso.

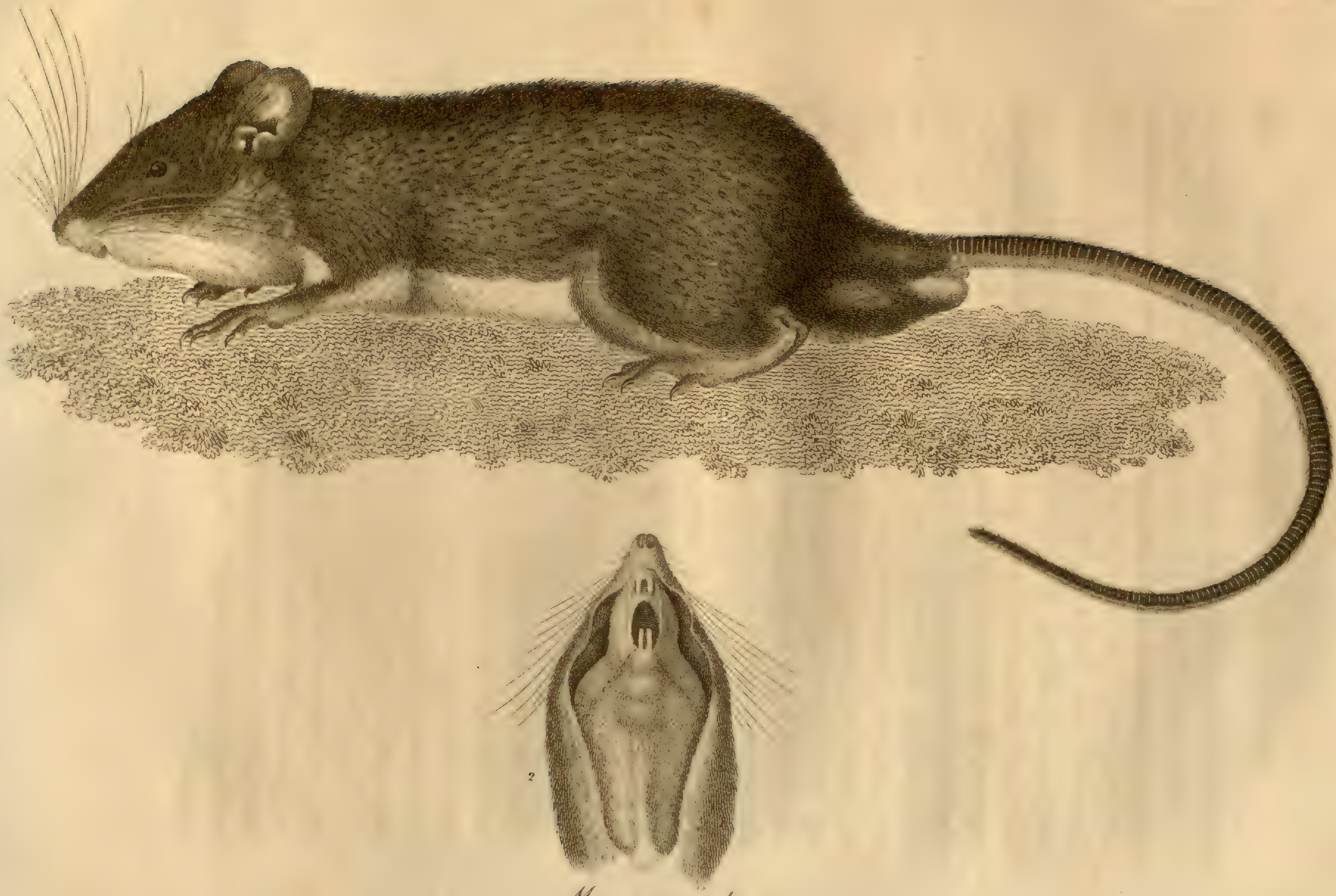
TRUNCUS. *Thorax* brunneo-niger, convexus, trapeziformis, anticè subcompressus, posticè dilatatus et ferè duplò latior, longitudine ferè latitudinis, lateribus ab apice ad basin rotundatis, margine postico truncato recto, sine excisione ullâ. *Scutellum* triangulare, nigrum. *Coleoptra* castaneo-brunnea, thorace duplò longiora et paulò angustiora a basi sensim ad apicem angustata, apice rotundata, striis (suturali marginalique exceptis) nullis. *Pedes* piceo-brunnei; *antici* coxis globoso-pyramidalibus, femoribus latioribus et paulò brevioribus; femoribus subdimidiato-ovatis, apice lateri interiori in mare constricto; tarsis in mare articulis tribus primis dilatatis; *postici* femoribus in mare subtus in medio dente parvo acuto triangulari armatis.

It is obvious, from the description of this species, that it recedes materially not only from the characters of the foregoing, but even of the genus; its antennæ being sub-incurved, the two first joints manifestly thicker than the three next, the eighth not in the slightest degree less than the other joints of the club, and the last obtuse at the apex. These differences, certainly, are so considerable, as in the system to warrant Latreille's institution of a new genus to include this insect and its congeners. In a monograph like the present, I have not thought it necessary to follow his example, because I know but this single species furnished with the

the same characters,—because its agreement in general habit with the rest of the species of *Choleva* is too close to make such a separation requisite for enabling the British entomologist to identify it, when it fails into his hands;—and, lastly, which indeed is the reason that has most weighed with me, because I do not possess specimens requisite for the necessary dissection and examination.

The following are the other particulars in which this species differs from the rest of the genus. Its head is proportionately narrower behind, and not there inserted into the thorax by a constricted neck. The thorax is more compressed and narrower before; the coleoptra relatively narrower, being no where so broad as the broadest part of the thorax; the coxæ more globose; and the hind thighs in the male (I know not whether also in the female, which I have not seen,) with a tooth underneath. In consequence of the greater width of the thorax than of the coleoptra, the body assumes a narrow obovate shape, the sides gradually becoming narrower from the middle of the thorax to the apex of the coleoptra.

VIII. *De-*



Mus anomalus.

Warner Sculp.

VIII. *Description of a new Species of the Genus Mus, belonging to the Section of Pouched Rats. By John Vaughan Thompson, Esq. F.L.S.*

Read March 3, 1812.

MUS ANOMALUS.

Anomalous Rat.

TAB. X.

GEN. CHAR. *Dentes primores* superiores cuneati, *molares* utrinque 3. rarius 2. *Claviculæ* perfectæ.

SPEC. CHAR. Mus buccis succuliferis, caudâ longâ squamosâ subnudâ, corpore spinis lanceolatis pilisque tecto.

THIS unique and hitherto unnoticed species is a native of the island of Trinidad, where it is understood not to be very uncommon, although in the space of six years residence I only met with two specimens: one that had been killed upon the property of M. Papillon, behind St. Ann's barracks, and kindly communicated by M. Labarere; the other I found dead on the high road, close by the above barracks.

It is of the habit and size of the common rat, the nose rather sharp, the ears naked and rounded and of moderate size: the feet have six callous tubercles beneath, are all 5-toed, the innermost toes

toes or thumbs extremely short and small, the whole armed with sharp claws, those on the exterior and interior toes being small in proportion: tail about six inches in length, scaly, with a few scattered setose hairs: testicles in the male very large, and situated under the base of the tail. The two upper teeth (vide Fig. 2.) are placed without the rictus or opening of the mouth, which is not larger than to permit a grain of Indian corn to pass through it. The cheek pouches are formed by a duplicature of the common integuments, open below, extending from the base of the upper teeth to the throat, and as high as the eye and ear: these cavities are lined throughout with scattered whitish hairs, and formed in the same manner as the abdominal pouch of *Didelphis*, &c., not at all in the way described by Buffon of the Hamster (*Mus Cricetus*) and the other pouched rats hitherto discovered. The body is covered with fine lanceolate spines, declining towards the throat and belly into a coarse setose hair, and every where intermixed with a finer kind of hair. The whole of the upper parts are of a purplish-brown colour; lower part of the cheeks, throat, inside of the limbs, belly, and under half of the tail, white; upper half of the tail nearly black.

The habits of this tribe of rats are singular and curious: where numerous, they do incalculable mischief in barns and granaries; for, not satisfied with what they can eat on the spot, they stow away and carry off in their cheek pouches no inconsiderable quantity, to be deposited in their retreats for times when food is not to be procured from without.

The present species, in addition to being covered with spines, differs from the rest included in the same section, in the great length of the tail. Some doubts might be entertained whether it did not more properly belong to the genus *Hystrix;* but in-

deed,

deed, when we examine into nature with due attention, we find she delights to mock the vain efforts of mortals to shackle and confine her within the bounds of generic characters, which are found to run so into each other as to render all attempts at method more or less imperfect. This animal must remain an anomaly in the family, as that of *Myoxus Chrysurus* amongst the Dormice; both serving as the connecting link between their respective genera and that of *Hystrix.*

IX. *An Analysis of Satin Spar from Alston Moor in Cumberland. By the Rev. John Holme, A.M. F.L.S.*

Read March 17th, 1812.

The extraordinary lustre of the mineral well known at present under the appellation of "Satin Spar*," added to certain other circumstances in its external character, induced me to suppose that its chemical constituents were not, as commonly believed, a simple combination of carbonic acid with lime, but that it contained some other ingredient. I resolved, therefore, to undertake a careful analysis of this substance; and as the result has confirmed my conjecture, an account of the process, and the proportions of its component parts, may not prove uninteresting to the Linnean Society, of which I have the honour to be a member.

1. A small specimen of very pure satin spar, which weighed 20 grs., was placed on a piece of iron heated to redness, in order to drive off any water which it might contain.

2. After the specimen had been in this situation for a few minutes, it was taken thence, and again weighed whilst glowing with heat. It was then ascertained that the weight of the sub-

* This mineral has been accurately described by Mr. A. Aikin, and also analysed by Mr. H. Pepys jun. but his analysis differs materially from mine.—*Phil. Mag.* vol. xii.

stance

stance was the same, and consequently that no water existed in its composition.

3. The same piece of satin spar was put into the bowl of a tobacco-pipe, which had a cover fitly adapted to it, and exposed to a red heat for the space of an hour and a half. It had by this time assumed a black appearance, and weighed, when immediately transferred from the crucible to the scales, 11.25 grs. of its original weight, or per cent. 56.25 grs. The weight of the carbonic acid expelled will, therefore, amount to 8.75 grs., or per cent. 43.75 grs. This experiment was repeated, and the result was the same.

4. After this the 11.25 grs. were dissolved in muriatic acid (but without effervescence) in a crucible of platinum, and placed before the fire until the volatile part was entirely evaporated. The crucible was then kept in a red heat for such a length of time, that the substance in it was fused, and afterwards, when cooled down to the temperature of the surrounding medium, became a hard, solid body of a black colour. Water was then added, which readily dissolved the muriate of lime contained in the mass, but had no effect on the other part; viz. the black coloured substance. When the insoluble part had subsided to the bottom, the clear liquor was drawn off by means of a syphon, and its place again supplied with pure water. This operation was repeated so frequently, that when with the last decanted portion of water a solution of the carbonate of soda was mingled, no precipitate was occasioned by it.

5. The black-coloured substance above mentioned being thus obtained apart, was folded up in a clean thin leaf of platinum, and heated red-hot for a short time, and when weighed as soon as taken from the fire, afforded at the rate of 2.6875 grs. per cent, after allowing for the weight of the platinum.

6. A

6. A small piece of this substance, together with borax, being exposed to the flame of a candle, urged by the blow-pipe, and melted, the borax exhibited the presence of manganese by its purple colour. No iron could be detected in combination with this oxide. Deducting, therefore, the 2.6875 grs. of the oxide of manganese from 56.25 grs., the remainder, viz. 53.5625 grs., will be the quantity of lime in 100 grs. of the substance analysed.

The following then, according to this analysis, are the proportions of the constituent parts in 100 grs. of pure satin spar, viz.

		Grs.
Lime - - - - - - - -	=	53.5625
Black oxide of manganese	=	2.6875
Carbonic acid - - - - -	=	43.7500
		100 grs.

After the great number of experiments which I have made on pure carbonate of lime, I have reason to conclude, that in 100 grs. of this substance, the lime = 55.9375 grs., and the carbonic acid = 44.0625 grs. Hence 100 grs. of pure satin spar contain

		Grs.
Carbonate of lime - - - -	=	95.75
Carbonate of manganese -	=	4.25
		100 grs.

St. Peter's College, Cambridge,
March 12, 1812.

X. *Descrip-*

X. *Description of Mus Castorides, a new Species. By the Rev. E. J. Burrow, A.M. F.L.S.*

Read April 7th, 1812.

I HAVE taken the liberty to lay before the Linnean Society an account of a curious animal, which I believe has not been mentioned by any writer on Natural History, and may, therefore, be thought worthy of the Society's notice.

The order to which it belongs is plainly that of *Glires*, and it appears to form the connecting link between the genera *Castor* and *Mus*; it is placed, indeed, so nearly midway between them, that it may be difficult to determine which has the better claim. Its teeth are those of the beaver, for there are four molares on each side in either jaw, and the incisors are simply wedged; but it is deficient in the broad flat tail, which seems to constitute an essential generic character of the beaver, being so closely connected with the wonderful habits of life peculiar to that creature.

The occiput was broken, and a part of the muscles remained on the skull when I examined it; but as far as I could judge from this state, the conformation more nearly approaches that of the Norway rat, *M. Decumanus,* than that of the beaver; particularly in the smallness of the cranium, in the construction of the anterior

anterior part of the zygomatic arch, and in the remarkable process of the lower jaw.

For these reasons I have referred it to the genus *Mus;* but some more skilful hand may hereafter designate it with greater propriety. Though nearly allied to both, it certainly differs generically from either the rat or beaver, and, in the hind feet, from, I think, all other Mammalia.

Such instances as this, the *Felis jubata*, and some recent acquisitions, show that there is much necessity for new intermediate genera in the Linnæan system: whenever these shall be arranged, the situation of the present subject will of course easily be found.

I have ventured to give the specific name "*Castorides*," and to call this the "*Beaver Rat*," rather than the *M. Coypus*, whose resemblance to both is not so great.

The following description is, to the best of my knowledge, tolerably correct.

Mus Castorides.

Mus, caudâ mediocri terete squamatâ subpilosâ, plantis palmatis.

Longitudo corporis 21 pollicum, caudæ $8\frac{1}{2}$.

Color cinereo-fuscus, subtus flavescens; pili breviores crassi, molles, cinerei, longiores fusci flavo annulati: auriculæ rotundatæ, nudæ: oculi parvi: mystaces longissimi, rigidi: dentes primores superiores 1 pollicem æquant, inferiores $1\frac{1}{4}$: pedes pentadactyli, planta palmata digitis externis penè separatis.

In addition to the above characters it may be remarked, that the nose is surrounded with whitish hair, that there are a few stiff bristles at the base of each claw, that the thumb is extremely short and the claw thick, that the length of the middle claw of the fore foot is one inch, and that of the metatarsus three inches.

The

The person who first possessed the animal in this country states that he bought it on board a ship from the Brazils: I had afterwards frequent opportunities of observing it, and of making my drawing while it was alive at Exeter 'Change. It died suddenly, and without any apparent cause; and is now in the collection of Mr. Bullock.

When teased or disturbed it uttered a weak cry, but was good-tempered, and not easily roused to resistance.

The method of feeding was the same with that of most of the Glires, but the forepart of the body was very little raised.

 XI. *On*

XI. *On Woodsia, a new Genus of Ferns.* By Robert Brown, Esq. F.R.S. Lib. L.S.

Read November 17, 1812.

There is perhaps no tribe of cryptogamous plants which since the time of Linneus has received greater additions to its number of species, or more considerable improvements in its systematic arrangement, than the *Filices:* and certainly no botanist has so essentially contributed to those improvements as the President of this Society; whose ingenious Essay on Dorsiferous Ferns may justly be considered as the groundwork of the more complete dissertations of Professors Swartz and Bernhardi, which have appeared since its publication*.

Linneus, in his latest work, the 13th edition of the *Systema Vegetabilium,* enumerates scarcely more than 200 Ferns, which he referred to twelve genera: while the *Species Plantarum* of the late Professor Willdenow contains upwards of a thousand plants of the same order, arranged under forty-three genera. It is however remarkable, that of this vast number of species nearly one half belong to four of the Linnean genera, namely *Polypodium, Acrostichum, Asplenium,* and *Pteris,* all of which were first proposed by Ray in his *Methodus Plantarum Emendata,* published in 1703;

* An. 1793, *in Mém. de l'Académie Royale des Sciences de Turin,* vol. v. p. 401.

without

without names, indeed, but with characters nearly similar to those of Linneus.

It appears, therefore, that the arrangement of Ferns at present universally followed is not wholly new: and that it has not attained such a degree of perfection as to supersede all changes in nomenclature, may be inferred from the genus *Polypodium* alone, though reduced nearly one-half by its present character, still including 157 species, or upwards of a seventh part of the whole order.

The expediency of subdividing *Polypodium*, as well as some of the other genera mentioned, especially *Acrostichum*, is indeed obvious, not merely on account of their great extent, but also from the striking differences in habit existing among the species referred to each.

I have, some time ago*, had an opportunity of remarking, that two plants referred to *Polypodium*, *P. ilvense* and *hyperboreum*, form a distinct genus, from the peculiar structure of their involucrum, even the existence of which had escaped preceding observers.

This genus I have named in honour of my friend Mr. Joseph Woods, whose merits as an accurate and skilful English botanist are well known to many of the members of this Society: and the object of the present communication is to illustrate it by some additional observations on its structure, and by a very perfect drawing, for which I am indebted to the friendship of Mr. Francis Bauer.

The character distinguishing *Woodsia* from all other genera of Ferns hitherto established, consists in its involucrum being inserted under the group of capsules, or, as it is technically called, the *sorus*, which it completely surrounds at the base; while it is in every stage open at top, having its margin divided

* *Prodr. Fl. Nov. Holl.* 1. p. 158, Obs. iv.

into a number of capillary segments, which from their length and incurvation entirely conceal the young capsules, and in a great measure the full grown.

That so singular a structure should have been hitherto unnoticed, even though both species of the genus have been described and figured since the publication of Dr. Smith's memoir, is not perhaps to be wondered at: for the membranaceous base of the involucrum is completely concealed by the capsules, and the marginal hairs, which alone are visible, exactly resembling the pubescence of the frond, have been universally confounded with it.

The difficulty, too, of separating the membrane entire from the frond, to which, by the pressure of the capsules, it is closely applied, is so considerable, that, since the publication of my remark already quoted, its existence has been doubted by a botanist, whose opinion, especially in whatever regards this order of plants, is of peculiar weight, and in opposition to which I should not retain full confidence in my own observations, though frequently repeated, were they not so distinctly confirmed by Mr. Bauer's excellent drawing.

I first observed the involucrum six years ago in living plants of *Woodsia hyperborea*, and have since repeatedly ascertained its existence in dried specimens of the same species, and of *Woodsia ilvensis.* These two plants are indeed so nearly related, that I find myself unable to construct for them clear specific characters; and therefore, in proposing them here as distinct species, I am, from want of sufficient materials to determine the question, rather following the prevailing opinion than my own.

To the characters and synonyms which follow, I have not thought it necessary to add descriptions of the two supposed species, these having been given by several of the authors referred to, and in every respect correctly, except what regards the involucrum.

WOODSIA.

WOODSIA.

Sori dorsales, subrotundi.

Involucrum calyciforme apertum margine crinitum: includens *Capsulas* pedicellatas: receptaculo communi elevato nullo.

Filiculæ, *frondibus cæspitosis, pinnatim divisis; pilis simplicibus squamulisque angustis instructæ.*

ilvensis. 1. W. frondibus bipinnatifidis, pinnis oblongis, pinnulis confluentibus multifloris: inferioribus subrepandis: infimis subæqualibus.

Polypodium ilvense. *Swartz. Synop. Fil.* 39. *Willden. Sp. Pl.* 5. *p.* 198. *Schkuhr Crypt.* 16. *t.* 19.

Acrostichum ilvense. *Linn. Sp. Pl. ed.* 2. *p.* 1528.

Nephrodium lanosum. *Michaux Amer.* 2. p. 198.

Habitat in rupibus Europæ et Americæ borealis. (*v. v.*) ♃.

hyperborea. 2. W. frondibus pinnatis, pinnis triangularibus oblongisve inciso-pinnatifidis: lobis integerrimis paucifloris: antico baseos productiore. *Tab.* XI.

Polypodium hyperboreum. *Swartz. Synop. Fil.* 39. *Willden. Sp. Pl.* 5. *p.* 197. *Engl. Bot.* 2023.

Polypodium arvonicum. *Smith Fl. Brit.* 3. *p.* 1115.*

Polypodium ilvense. *Withering Arrang. ed.* 3. *t.* 3. *p.* 774.

Acrostichum hyperboreum. *Liljeblad in Act. Stockholm.* 1793. *p.* 201. *t.* 8.*

Acrostichum alpinum. *Bolton Fil. Brit.* 76. *t.* 42.

Ceterach alpinum. *Lamarck et Decandolle Fl. Fran.* 2. *p.* 567.

Habitat in Europæ alpibus. (*v. v.*) ♃.

EX-

EXPLANATION OF TAB. XI.

1. A native specimen of *Woodsia hyperborea*, natural size.
2. The stipes and lower part of the frond of the same plant, magnified 3 times in diameter.
3. A pinna of the same plant, magnified 10 diam.
4. A pinna from another specimen, in which the clusters of capsules (sori) are more numerous and confluent, 10 diam.
5. A single cluster of capsules within their involucrum, the membranaceous base of which they entirely conceal, magnified 50 diam. (2500 times in superficies).
6. The involucrum spread open, with only one capsule left in it, magnified 50 diam.

7. An unripe capsule.
8, 9. Side and back views of a ripe capsule.
10, 11. Capsule opening and entirely burst, shedding its seeds.

(7–11: magnified 50 diam.)

12. A seed magnified 200 diam.
13. A frond of a cultivated plant of the same species, natural size.

XII. *An*

Francis Bauer del.

Woodsia hyperborea!

Warner Sculp.

XII. *An Account of four rare Species of British Birds. By Mr. William Bullock, F.L.S.*

Read November 17, 1812.

Strix nyctea.

Strix nyctea. *Linn. Syst. Nat.* i. *p.* 132. 6. *Faun. Suec. p.* 25. *n.* 76. *Lath. Ind. Orn.* i. 57. 20.

Great White Owl. *Natural History of Birds, by G. Edwards, p.* 61. *t.* 6.

Snowy Owl. *Lath. Syn.* i. 132. 17.

This remarkable species of Owl, the most beautiful and majestic of the genus, was first described by Linnæus in *Faun. Suec. ed.* i. *p.* 15. *n.* 54., and was afterwards described and figured by Mr. Edwards as an inhabitant of Hudson's Bay; later authorities mention its being found in Russia and Germany; but it has never till now been added to the catalogue of British Birds. In July last, in the island of North Ronaldsha, one of the Orkneys, I was informed that a bird of this kind had been seen on the Links or rabbit warren for several weeks; and shortly after I had an opportunity of examining it for some time at the distance of about forty yards: it was a male, and its companion had been killed a few months before on the same island. One of them had likewise visited the adjacent isle Westra, and remained there for

for some time. In September I was so fortunate as to procure one in Unst, the most northerly of the Shetland Isles; it had been killed a few weeks before by Mr. L. Edmondston, a young gentleman well versed in the ornithology of that country, and from whose testimony, as well as that of several gentlemen of the Isles, I have not the smallest doubt of its breeding and remaining the whole year in the mountainous precipices of both that island and Yell: they are seen there at the end of the summer in company with their young, three or four together; the latter are then brown. Their flight, which I had several opportunities of observing, was more light and buoyant than any of the hawks, but not so much so as our common barn owl. They prey by day on various animals: one wounded on the Isle of Balta disgorged a young rabbit whole; and that now in my possession had in its stomach a sandpiper with the plumage entire.

TRINGA CALIDRIS.

Tringa Calidris. *Linn. Syst. Nat.* i. *p.* 252. 19. *Lath. Ind. Orn.* ii. 732. *n.* 2.

Dusky Sandpiper. *Lath. Syn.* v. *p.* 174. 18.

La Maubeche. *Brisson Ornith.* v. *p.* 226. *t.* 20. *f.* 1.

One of the specimens now before the Society was bought from among several at a poulterer's in May last; the other was shot by Mr. William Strang, of the Island of Sanda, on the 20th of August last, out of a small flock on the edge of the great Lake Stennis, on the mainland of Orkney. I received it several days after it was killed, but in too putrid a state to examine the contents of the stomach or the colour of the eyes. It was unknown in Orkney.

HIRUNDO

Hirundo Pratincola.

Hirundo Pratincola. *Linn. Syst. Nat.* i. *p.* 345. 12.
Glareola austriaca. *Lath. Ind. Orn.* ii. *p.* 753.
Austrian Pratincole. *Lath. Syn.* v. *p.* 222. *t.* 85.

The first instance of this bird having been killed in Britain occurs in 1807, when one was shot in the neighbourhood of Ormskirk in Lancashire: it was preserved by Mr. J. Sherlock of that place, from whom I purchased it a few days afterwards. On the 16th of August last I killed another specimen of this bird (now sent for the inspection of the Society) in the Isle of Unst, about three miles from the northern extremity of Britain. When I first discovered it, it rose within a few feet and flew round me in the manner of a swallow, and then alighted close to the head of a cow that was tethered within ten yards distance. After examining it a few minutes I returned to the house of T. Edmondson, Esq. for my gun, and, accompanied by that gentleman's brother, went in search of it. After a short time it came out of some growing corn, and was catching insects at the time I fired; and being only wounded in the wing, we had an opportunity of examining it alive. In the form of its bill, wings, and tail, as well as its mode of flight, it greatly resembles the genus *Hirundo;* but, contrary to the whole of this family, the legs were long, and bare above the knee, agreeing with *Tringa;* and like the sandpipers, it ran with the greatest rapidity, when on the ground or in shallow water, in pursuit of its food, which was wholly of flies, of which its stomach was full. Whilst living, the edges of both mandibles, and the base of the lower one were bright scarlet orange, the legs purple brown, and the irides light brown. It was a male, and weighed 2 oz. 11 dwt. None of the gentlemen of the island who saw it ever observed it in the

 country

country before. The one killed near Ormskirk is in the possession of the Right Hon. Lord Stanley, and it and the present one are the only *Pratincoles* killed in Britain, I believe, that are yet known. Those gentlemen who have added them to their collections have only foreign specimens.

Anas africana.

Anas africana. *Lath. Ind. Orn.* ii. *p.* 875. 104.
African Teal. *Lath. Syn.* vi. *p.* 555. 93.
La Sarcelle d'Egypte. *Planches Enluminées* 1000.

This species of duck, several of which have come within my knowledge, were all purchased at Leadenhall market during the winter season, and were said to be taken in Lincolnshire. Dr. Latham, in his very excellent work on Birds, says they inhabit the rivers in Egypt; which, if so, is a remarkable circumstance, as few natives of so warm a country could be supposed to migrate so far north at that season. Buffon figures it in the *Planches Enluminées*, to which Dr. Latham refers his African Teal. That figure is so good as to leave no doubt of its being the bird; otherwise the var. A. of the *Anas Fuligula* of *Lath. Syn.* (*Anas Nyroca* of *Gmel. Syst. Nat.* and of *Lath. Ind. Orn.* ii. 869. 91.) might be mistaken for it. Indeed I cannot help thinking that Dr. Latham has described the same bird twice under different names. In the account of the latter it is said to inhabit the river Don, which is certainly the most probable residence of a bird that visits this country only during winter.

London Museum,
Nov. 17, 1812

XIII. *An Account of some new and rare marine British Shells and Animals. By George Montagu, Esq. F.L.S.*

Read March 5, 1811.

Since the publication of the Supplement to *Testacea Britannica*, a few highly interesting species of shells having come under my inspection, together with some of the animals to which they belong, I am induced to lay them before the Linnean Society, in order that the Conchologist may reap the earliest advantage of my researches; and that they may be added to the catalogue already given to the public in the abovementioned work.

In addition to these I beg leave also to submit to the Society an account of some animals of the division *Mollusca* and *Intestina*, which for the first time will claim a place in the British Fauna; and whose beauty and singularity cannot fail to attract the attention of the Helminthologist.

VERMES TESTACEA.

Lepas cornuta.

Tab. XII. Fig. 1.

Lepas aurita. *Chem. Conch.* viii. *p.* 345. *t.* 100. *f.* 857. 858.
Ellis, Phil. Trans. 1758. *t.* 34. *f.* 1? *Nat. Misc.* 16. *t.* 672?

Ovate, fleshy, and very slightly compressed, with five very small valves, besides two tubular fleshy projections like ears at the

the top: the peduncle is longer than the body, increasing in size towards the base, where it spreads considerably for the purpose of adhesion: the colour is white, clouded or rather irregularly marked with three broken stripes of purplish-brown on each side the body; the peduncle is also similarly striped: at the lower part of the aperture on each side is a small linear valve; on the upper part are two others much smaller, linear, and curved; and on the middle of the back is a very minute dorsal valve, scarcely visible to the naked eye; these valves are chiefly distinguished by being white. The horns or auricles are large, and convex in front, where they are mottled with purplish-brown; behind they are canaliculated.

Length of the body three-fourths of an inch; of the auricles three-eighths; of the peduncle an inch and a quarter. In some points of view, when examined by a lens, a fine iridescent colour is observable.

Taken alive from the bottom of a transport stranded on the coast of Devon.

The scientific Conchologist will at first conceive that he has in this species identified *Lepas aurita* of Linnæus: be that as it may; it would be totally inconsistent with the present view of the subject, to doubt that that species did actually possess eight valves round the mouth: unless, therefore, it can be imagined that Linnæus was deceived, the present species cannot be referred to the *L. aurita* of that author. Chemnitz appears to have given a bad figure of our shell, which he refers to the Linnæan *L. aurita*, although he could not discover more than two valves, and those were at the opening; but probably was induced so to do from no other cause than that his species had auricles; for he expresses his surprise that Linnæus should have discovered no less than eight valves round the mouth, and which seems to have left some

doubt

doubt upon his mind about their being actually of the same species, especially as he examined several.

It may indeed be urged, that it is not less extraordinary (if the species given by Chemnitz be the same as mine) he should have overlooked the other three valves; but as those valves are extremely small, it is probable they would be unobserved in badly-preserved specimens, which it is most likely that author described from, judging from his figure.

With respect to the species here described, it may be proper to remark, that it was examined with the greatest care and attention while alive, and a drawing taken while it was in sea water; and that the two superior valves, as well as the dorsal one, have been represented in the figure that accompanies this, fully as large as they actually are, in order that they may be distinguished without the assistance of a glass. Considering, therefore, the minuteness of these valves, it will not appear extraordinary that Chemnitz should have overlooked them in badly-preserved specimens.

Besides the *Lepas nuda carnosa aurita*, figured in the 50th vol. of the *Phil. Trans.*, and the Eared Barnacle represented in the *Naturalist's Miscellany*, (which I can only refer to with doubt for the present subject,) Gmelin has quoted Seba and Edwards for the Linnæan *L. aurita.*

Whether any of these be really the *Lepas aurita* possessing the character of *ore octovalvi dentato*, as originally described by the Swedish Naturalist, I shall leave to others to determine, since some of them are so miserably executed as not to represent the smallest appearance of belonging to the division *Testacea*, being destitute of visible valves.

Whether this may really be considered as distinct from any or either of the species here enumerated it is difficult to determine;

 but

but I am confident, that it is quite impossible it should be the shell which Linnæus has so strongly stamped the character of by these words: *apertura clausa valvulis testaceis octo.*

LEPAS MEMBRANACEA.

TAB. XII. Fig. 2.

Test. Brit. Sup. p. 164.

It will be observed in *Testacea Britannica* that this species was described from a dried specimen, the only one that had been procured; but having since been so fortunate as to obtain a great many fresh, and some not dispossessed of vitality; and conceiving that a correct figure of it might be highly acceptable to the scientific, it has been delineated with that view. It is however essential that a little alteration should be made in the original description, since in the dried specimen of this very membranous species, not only the colour was vanished, but also by contraction the sides had become unnaturally wrinkled.

Sub-parallelopipedal, sub-compressed, fleshy, with five small valves: peduncle cylindric, as long as the body; colour pale blue, with three broad stripes of dark blue on each side, running from the summit to the base of the peduncle: the plumes of the animal's tentacula purplish-blue: on each side of the lower part of the aperture is a triangular valve; on the top are two small linear valves; and a similar dorsal valve is on the upper part of the back. Length of the largest specimen, including the peduncle, nearly three inches; breadth above half an inch.

Many of this elegant species of *Lepas* were discovered on the bottom of a transport stranded on the coast of South Devon in January 1809; she had been to the north of Europe, and was last from Portugal.

BULLA.

BULLA.

It has been long known that one of the Linnæan species of this genus of *Testacea*, instead of being the external covering of the animal to which it is attached, is concealed within. The *Bulla aperta* is so completely concealed by its animal, that there is not the smallest appearance of it: dissection, therefore, probably brought it first to light. The animal has been distinctly described by several authors under different names, and lastly by Muller under the title of *Lobaria quadrilobata.*

In *Testacea Britannica* two other species of Bulla have been given, whose nature it is to be concealed by the animals to which they belong; and since the publication of the Supplement to that work, two other species of a similar nature have occurred that appear to be undescribed. These four possess characters sufficiently similar to determine them to be of the same genus; but, as they cannot be arranged with *Lobaria* nor any other genus in the divisions of *Vermes*, *Mollusca* or *Testacea*, I have thought it proper to form these animals into a new genus, under the title of *Lamellaria.*

The animals of this genus are more nearly allied to *Aplysia* in some particulars than to *Lobaria*, to which they are only connected by being testaceous Vermes; but they differ from the former in not having reflected membranes, and in the shell being testaceous, and spirally formed at one end, which in that is corneous and destitute of convolution. From *Lobaria* they also differ in being formed of two fleshy laminæ, and not into lobes or lateral divisions. It is not improbable that some species of *Lamellaria* might be mistaken for *Dorides*, but there are sufficient distinguishing characters obvious to the Helminthologist.

There appear to be two natural divisions in this genus of Vermes,

Vermes, those with a plumous appendage on the right side, answering the purpose of branchiæ or pulmonary organs, and those destitute of such an apparatus for absorbing oxygen (by the decomposition of the water in which they reside) for recruiting vital energy.

In order to prevent confusion, I have suffered the animals and their respective shells to bear the same trivial names, so that they may be readily recognised in the present system, where Conchology makes one of the primary divisions, and independently treats of the testaceous part of a large portion of Vermes.

For the two species of *Lamellaria* already described I beg leave to refer to *Bulla Haliotoidea* and *B. plumula* in *Testacea Britannica*, where the animals are figured: the former is of that division which is destitute of the plumous appendage; the latter is possessed of it.

Lamellaria.

Body formed of two fleshy lamellæ; the vitals protected by a convoluted shell concealed beneath the skin: foramen on the right side.

** With a plumous Appendage.*

Lamellaria membranacea.

Tab. XII. Fig. 3.

Body sub-orbicular, greatly depressed, but convex above, and usually scalloped or irregularly indented on the margins of both laminæ: the superior lamina is of a brownish colour in streaks and lines, covered with larger and smaller intermediate conic papillæ: the inferior lamina extends considerably beyond the other, and forms a broad base or sustentaculum; this is of a pale colour, spotted with blueish gray: the head is usually concealed between the two laminæ, but is occasionally exposed by con-

tracting

tracting the upper lamina, as represented in the annexed figure: the front is formed into a bifid process, like two angulated tentacula: behind, originating from the base of this, are two tentacula of a sub-cylindric form, truncated at the end, canaliculated beneath, and uniting towards their base: eyes two, very small and black, placed contiguous at the base of the tentacula: the plumous appendage on the right side originates near the head immediately behind the foramen. In one instance a cylindric proboscis was observed to be protruded half an inch in length, but the animal died with it retracted: the genitals of one specimen were also very evident immediately before the lateral foramen, and appeared slender, and sub-spiral, as in the common garden snail. Diameter of the largest upwards of two inches.

The shell, or *Bulla membranacea*, *Tab.* XII. *fig.* 4. is sub-membranaceous, ovate, and greatly depressed, with a minute lateral volution. It is nearly allied to *Bulla plumula*, but is more membranous, rather more convex, the small volution and apex more prominent, and not placed so lateral: it is wrinkled concentrically, and covered with a silvery epidermis tinged with pink, changeable in different points of view, occasionally appearing nacred or metallic. As the shell dries it usually cracks about the margin, which is extremely delicate; and the contraction of the epidermis gives it a more wrinkled appearance. The size of the largest shell taken is nearly an inch and a half in length, and an inch in breadth.

It is remarkable that this very singular animal, and highly interesting shell, should have evaded the researches of naturalists so long, especially as they are of considerable magnitude. Probably however the shell, independently of the animal, would never have come to light, since it appears to be too delicate to bear the agitation of the waves upon the finest sandy shore. Dissection of

the animal, therefore, is the only probable means of obtaining the shell. But what is most extraordinary, the place where these *Lamellariæ* are only found (the salt rock in the estuary of Kingsbridge) has been a favourite place of research for a great many years; and yet not a single specimen was ever taken till the year 1809, about the latter end of which several were found in one day, and many others of various sizes on subsequent visits to the same spot. The locomotion of this species of Vermes is not very considerable; but it is extremely amorphous when in progressive motion. In a quiescent state, or when disturbed, the lamellæ are contracted, and the inferior or sustentaculum is nearly obscured by the superior.

** *Without a plumous Appendage.*

LAMELLARIA TENTACULATA.

TAB. XII. Fig. 5, 6.

Body sub-orbicular, depressed, convex above: the superior lamina is yellowish, sprinkled with bright brimstone colour, and marked with round pustules interspersed with a few black spots: in the front is a sinus: tentacula two, long and filiform, placed one on each side the front of the head: eyes two, black, situated at the base of the tentacula on the outside, but usually concealed by the anterior margin of the superior lamina; they are however sufficiently conspicuous on the under side of the animal by reason of the transparency of that part: the inferior lamina or sustentaculum is ovate, attenuated at the posterior end, projecting a little beyond the shield or upper lamina, when the animal is in progressive motion, but which conceals the head or anterior part, except about three-fourths of the tentacula.

A variety is destitute of the black spots, and the yellow are more

more conspicuous. This specimen was considerably larger, being three quarters of an inch in diameter.

The shell, or *Bulla tentaculata*, is so extremely similar to *Bulla Haliotoidea*, that the figure of it has been omitted as ùseless, since it could not convey the nice distinction; and the shell to which it is so nearly allied has already been given in *Testacea Britannica*, together with the animal to which it belongs. It is rather depressed, and more opaque than the shell of *L. Haliotoidea*, but would not be generally discriminated independently of the animal. To the animal, therefore, we must look for the actual identity of its shell; and by so doing no confusion will occur, since there is a material distinction between *Lamellaria tentaculata* and *L. Haliotoidea;* the colour is different, especially the more extended membranous margin of the superior lamina of the former, which, with the long and slender tentacula, are obvious marks of distinction. In the few specimens examined there did not appear to be any arm or appendage as in *L. Haliotoidea*, and yet a similar sinus in the anterior margin of the upper lamina indicates an occasional protrusion of some similar process, which may possibly be only exerted in the season of love. A comparison of the figure which accompanies this, with that of the animal of *Bulla Haliotoidea* in the vignette of the second part of *Testacea Britannica*, *fig*. 6. will be sufficient for future discrimination.

The discovery of this species so recently in the same place with the last described, after such repeated examination of the spot for so many years, is an additional proof of the inexhaustible stores that lie hidden in the deep, and that by some fortuitous circumstance are brought to light. Of this species very few have been taken; but as none of the genus appear to possess any great powers of locomotion, it is probable they have their natural beds, where they congregate in great abundance, (a circum-

stance common in aquatic hermaphroditical Vermes,) and become a delicious repast to a variety of fishes.

Mya striata.

Tab. XIII. Fig. 1.—A.

Shell sub-pellucid, white, of a delicate texture, finely striated longitudinally: the shape is sub-parallelogramical; the anterior end is truncated, and the valves reflect, forming a hiatus when the shell is closed; the posterior end is rounded; the umbo is small, and placed nearest the posterior end. The inside is white, and slightly reflects a nacred hue: the hinge is simple, and completely that of a true Mya, possessing one erect broad tooth in one valve, that locks into a corresponding cavity in the other valve.

Length half an inch; breadth one inch.

This new and interesting species, it appears, was discovered by Mr. Lyons in Tenby-bay, on the south coast of Wales, from whence specimens were sent to Mr. Norris, who obligingly favoured me with that from which the above description is taken; and I have been assured by the Rev. Mr. Bingley that several more have been very recently taken by the same gentleman after a storm, which were all alive. Round the anterior end of my specimen there is a portion of agglutinated sand, which induces an opinion that, like most others of the same genus, it resides imbedded in the sand at the bottom of the sea.

Terebratula Cranium.

Tab. XIII. Fig. 2.—B.

Terebratula Cranium. *Mull. Zool. Dan. Prodr.* 3006.

Anomia Cranium. *Gmel. Syst.* vi. *p.* 3347.

Shell ovate, convex, equilateral, inequivalve, the upper valve projecting considerably beyond the lower at the beak, where there is a

small

small perforation. It is thin, except about the hinge, sub-pellucid and brittle, but not glabrous; for by the assistance of a powerful lens the whole surface is observed to be minutely striated in a decussated order, appearing like fine shagreen: there are also some irregular concentric wrinkles very obvious to the naked eye: the margin is not regularly rounded, but in the front two sub-angles are formed by the line of regular curvature becoming less flexuous.

The inside is of a singular structure about the hinge: beneath the beak of the upper or perforated valve the shell is very thick, rising on each side into a process that forms the inseparable joint or hinge, which firmly unites the two valves: this contrivance also forms a channel of communication with the aperture in the beak, adapted to the tube or syphon of the animal: further within the shell, but connected with the channel, is a depression which is roughened by two or three very slight longitudinal ridges. The lower valve is also much thickened at the beak, and rises into a transverse ridge, standing above the plane of the margin, in the middle of which there is a groove corresponding with the channel to the perforation in the beak of the other valve, and the sides reflect for the purpose of receiving the fangs of the opposite valve; and by such contrivance they are similarly and as firmly articulated as the joint of the claw of a crab, without the assistance of a connecting cartilage, of which it seems to be destitute: from each side of the interior part of the transverse ridge, a sub-arcuated compressed process or tooth projects inwards nearly to the middle of the shell, their points reflecting and a little diverging; at the base of each of these another similar process, but smaller, stands erect. The colour of the shell is pale brown, or sullied white. Length of the superior valve nine-

 eighths

eighths of an inch, that of the inferior valve one inch; breadth seven-eighths.

I have great pleasure in recording this rare shell as a production of the British seas: three of them were taken up on the cod-lines in the deep, eastward of Bressay, in Zetland, by the Rev. Mr. Fleming, minister of that place, who favoured me with the specimen represented in the annexed plate. This attentive naturalist assures me that the three specimens were firmly affixed to each other by the tube through the perforation at the beak.

Muller appears to have described this species as an inhabitant of the Norwegian sea; at least his *Terebratula Cranium* seems so nearly allied to it, that I have ventured to consider it as the same shell. This great naturalist is silent with respect to the internal structure of the shell, or conformation of the animal. From what I have been able to ascertain from moistening the dried specimen which came to me in its shell, it seems nearly allied to a *Tethys*, possessing but one tube or syphon, which it protrudes through the aperture in the beak, and which serves the triple purpose of mouth, foot and sucker, or instrument of adhesion. In the fins or margin of the animal there were several slender arcuated testaceous plates serving as bones, but their exact situation and peculiar office could not be ascertained.

It must be admitted by every Conchologist, that the Linnæan arrangement of *Anomia* is defective, and the characteristic description of the genus, as well as of the animal inhabitant, is vague and indefinite.

With respect to the species of shells at present arranged under the title of *Anomia*, some are destitute of any perforation, some have an opening close to the hinge in the under valve, and others are perforated in the beak of the upper valve. Such an essential difference

difference in the formation of these shells must occasion a very material dissimilarity in the situation and structure of the teeth, as well as in the conformation of the animals that inhabit them. What those fossil shells really may be, or to what genus in conchology they might be referred, which are destitute of any perforation, and which have been placed amongst the *Anomiæ*, is not to be determined, since the structure of the teeth is concealed from our view, as the greater part of them are complete petrifactions, and have their valves closed. We may, however, be assured that the animal which inhabited such imperforate shells, must have been very different from those which are known to inhabit such as are perforated.

The *Mya inæquivalvis* of *Testacea Britannica* is in the fossil state considered as an *Anomia*, though it has strictly the hinge of a *Mya*, and the animal inhabitant is materially different from what is observed in either of the perforated recent *Anomiæ*.

But let us go further, and examine the structure of some of the recent shells together with their animals, and I doubt not that most Conchologists will agree with me, that there is a much greater natural division between those which have the under valve perforated, and such as have a perforation in the beak of the upper valve, than there is between a *Tellen* and a *Venus*, or indeed between any two genera of the Linnæan system. We have only to look to the natural habits of these two kinds of shells, including their animal inhabitants; and if those, together with the external appearance, be not sufficient, let us have recourse to the internal structure, and especially the great leading characters, the hinge and teeth, and we shall find that the more strictly and accurately the comparison is made, the further will these shells appear to be separated from each other. If, for instance, the *Anomia Ephippium* be examined, it will be found that the animal is totally destitute

destitute of locomotion, and is immovably fixed from its earliest infancy to whatever chance has thrown in its way: to this substance, be what it may, it throws out from the perforation in the under valve a ligamentous pedicle or foot, which becomes firmly attached; and in the course of time, as the animal grows, a testaceous plug is formed on the object of its adhesion, and as firmly connected to a rock or other substance, as it is to the pedicle or part which has secreted the testaceous fluid; and no separation can ever take place without external violence and consequent mutilation. On the contrary, if we attend to the habits of *T. Cranium*, *Vitrea*, or any of those Linnæan *Anomiæ* with a perforation in the beak of the upper valve, I am persuaded that we shall find all of them to be inhabited by animals capable of a certain degree of locomotion; and that, instead of being moored fast for life by a pedicle issuing from the perforated valve, these animals receive all their nourishment through this aperture by means of a tubular mouth, which has also the property of adhesion when required, either for the purpose of securing them stationary, or to acquire locomotion by extension and contraction, as I have observed in the animal of *Mya suborbicularis*, and one or two others, which appear to be inhabited by a *Tethys*.

From what has been related, it may naturally be imagined that the internal structure of the shells in question must materially differ, and such is actually the case, without the exception of one solitary character; but this I shall not here enlarge upon, as a comparison is readily obtained by the scientific Conchologist.

Lamanon, as well as some other French naturalists, have considered some shells similar to this, perfectly distinct from *Anomia*; and that very judicious physiologist Muller has separated them, and has adopted the generic title of *Terebratula* for those of

the

the Linnæan *Anomiæ* with the beak of the superior valve perforated.

So little are we acquainted with the animal inhabitants of the greater part of *Testacea*, that it has been usual to follow Linnæus in assigning to each genus of shells, as arranged by him, animals of a similar nature; but later observations have proved that nothing can be more distinct than many of the animals which inhabit shells of the same family under the Linnæan arrangement. The animals of the Linnæan *Anomiæ* are as different as the shells, and do not correspond with the general characters assigned to the genus: in fact, the animal appears to be so indefinable, that no name has been given to it.

Lamanon gives a long description of the animal of a species of *Terebratula* which was found on the coast of Tartary by the unfortunate Peyrouse, in his voyage of discovery, in which he observed several bones (testaceous plates) that support the ears (the membranaceous rays or fins ?). This writer speaks of the syphon or tube merely as a pedicle or foot of adhesion, not having seen it in the light of a mouth, through which all nourishment is taken, (as in the greater part of the Vermes found to inhabit bivalve shells,) but speaks of a mouth with a transverse opening, which is ill defined, and I have little doubt he was mistaken. The great powers of adhesion ascribed to the tube of this animal can only be in proportion to the diameter of the cup of the tube, in which a vacuum is formed, which cannot exceed two lines: the philosophical naturalist may therefore judge of the extent of the adhesive power these animals possess. The shell of this Tartarian species appears to be in many respects allied to the *Terebratula Cranium* in the hinge, and processes thereto attached, but externally is much more wrinkled: besides, it is thick, and somewhat different in colour. This appears also to be essentially different from

from the Gmelinean *Anomia vitrea*, as it has neither the hyaline nor glossy appearance which that species is said to possess, nor has it the internal midrib in the lower valve, which Chemnitz's figure bespeaks, and which seems to have been drawn from a specimen in his own cabinet.

Upon the whole, I cannot liken the present subject to any species so nearly as to the Mullerian *Terebratula Cranium*; and there is the greater probability that it really is that shell, when it is considered that the distance is not great between Zetland and the coast of Norway, where Muller's shell was found.

I trust I shall be excused for having been thus diffuse on so interesting an acquisition to the catalogue of British Testacea. I was enticed to this by the opportunity of examining and comparing a recent *Terebratula* containing the animal, with that of *Anomia*, and from that comparison I have been induced to adopt the judicious division of Muller.

TURBO ZETLANDICUS.

TAB. XIII. Fig. 3.

Shell with five tumid volutions, furnished with spiral ridges; which are decussated with longitudinal elevated striæ, that rise into angular tubercles at the points of decussation; at the base of the shell the spiral elevations are very prominent, and destitute of striæ: the apex is obtuse; aperture nearly orbicular and marginated.

Length two lines: the colour is white.

This very elegant little shell is another new species, for which we are indebted to the researches of the Rev. Mr. Fleming, who found it on the shore of the isle of Noss in Zetland; a situation which has been little explored with a scientific eye. From this quarter many of the marine productions described by Muller and other northern continental writers may be expected, especially in

the class *Zoophyta*, of which I have already been favoured with a few of a very interesting nature, either entirely new, or not described as British.

Turbo dispar.

Tab. XIII. Fig. 4.

Shell strong, short, conic, of a blueish-gray colour, with four spires; the lower volution is very large, obsoletely striated in a spiral direction, wrinkled obliquely, and sub-carinated at the base; the superior volutions are very small, making together about one-fourth the length of the shell, and are usually decorticated: aperture sub-orbicular, within of a dark purple, with one pale band near the lower extremity; inner lip spreading.

Length a quarter of an inch; breadth very little less.

This species has somewhat the habit of *Turbo ziczac*, but is proportionally shorter, more obtuse, has a greater disproportion between the body and superior volutions, and does not possess the zigzag markings usually attendant on that shell, nor the two pale bands generally exhibited within the aperture, but invariably one only. The operculum is corneous, and of a dusky colour, and was attached to all the specimens examined; an indubitable evidence of a living shell, or of containing the animal.

I was favoured with a few specimens of this shell from the Rev. Mr. Bingley, who found them at Poole.

Patella distorta.

Tab. XIII. Fig. 5.

Shell rugged and distorted, without regularity; rather depressed, with an irregular margin, and very small papillæform vertex, not central: the inside is not glossy, but appears through a lens to be minutely granulate.

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This is another Zetlandic production discovered by Mr. Fleming, who assures me that it is not uncommon on stones in deep water, and was first noticed on the stones attached to the cod-lines which had lain long under water. The colour is invariably brown, as well on the inside as without; and when examined by a glass appears papillous.

The largest specimens are about half an inch in diameter.

VERMES MOLLUSCA.

Doris.

Since the writings of Linnæus, it is not surprising that the rapid cultivation of the science of Natural History should have extended the field so greatly as to call for some new arrangements in this branch as well as in all the others. It is true that with some alterations in the leading characters of the Linnæan genera, many of the more recently discovered animals might still have found a place in the arrangement of that great naturalist: but systematic physiologists are as verbally tenacious as lawyers; and therefore, where the generic characters do not exactly apply to the object, a new genus is formed for the purpose. It appears that the genus under consideration admits of three or four natural divisions; and, as the number in this genus is not very extensive, such a division into families might have answered all the purposes of identifying species, without too greatly multiplying genera, which in the end will frustrate the intention of systematic arrangement.

It must be acknowledged that there are several animals arranged with the Gmelinean *Doris*, which want the essential Linnæan characters of that genus: for instance, *Doris clavigera* is destitute of vent on the back surrounded by a fringe. This, therefore, (as well

well as *papillosa* and some other of the Linnæan *Dorides,*) has been removed and formed into a new genus, and is described by Bosc under the title of *Tritonia.* The *Phyllidium* of Cuvier appears to be formed from another division of *Doris:* and the *Scyllæa,* which was constituted by Linnæus, does not appear to be at greater variance with some of the animals placed under the title of *Doris,* than many species of *Doris* are with each other.

It must be admitted that Linnæus, and after him many other able naturalists, placed in the genus *Doris* many animals wanting the leading characters which should constitute them of the same family; we need only refer to the multivalve shell *Chiton,* which that great naturalist says is inhabited by a *Doris,* to prove how incongruous are some of the species of the same genus; and yet how implicitly have succeeding writers continued these errors!

The two following animals, according to the more modern system, will appear to belong to *Tritonia;* or perhaps one of them is so nearly allied to *Scyllæa* as to create some difficulty to determine in which of those genera it ought to be placed. In the present instance I shall continue them in the genus in which I had originally placed them, amongst the fasciculate species of *Doris,* as belonging to the same family I had the honour of laying before the Linnæan Society upon a former occasion, and reserve a different arrangement for future consideration.

Doris pedata.

Tab. XIV. Fig. 1.

Body long, slender, and acuminated behind; the front rounded: tentacula four, large, subclavated and wrinkled; two are situated in front rather projecting forwards; the others stand nearly erect at a little distance behind: papillæ or cirri on the back numerous, long, and subclavated when contracted, but nearly filiform

when extended; these in appearance are disposed in four fasciculi on each side of the back, and are occasionally divided, or connected transversely: the sustentaculum is slender, from which in front issue two laterally recurved, fleshy members, that seem to assist progressive motion: behind the two posterior tentacula are two very minute black eyes, generally obscured by the anterior fasciculate papillæ, which are so nearly connected with those tentacula as might occasion their being confounded, did not their wrinkled summits bespeak their distinction: the colour of the whole body of the animal is purplish pink, the papillæ more of a scarlet, inclining to orange towards their ends, the tips white.

Length full half an inch. Devon coast: rare.

This extremely beautiful animal is without doubt a *Tritonia* of the new school: the body is not bilaminated, or covered with a marginal membrane like that which is now essential to constitute a true *Doris;* nor has it the anus on the back, nor ventral plumes; but the tentacula are retractile within receptacles.

DORIS BIFIDA.

TAB. XIV. Fig. 2.

Body linear, posteriorly acuminated: the front rounded, with two broad erect bifid tentacula, the divisions of which are obtuse and unequal: along each side are about twelve pedunculated appendages of different sizes, three pair of which are greatly superior to the rest; these, when examined by a microscope, show the clavate part to be ramified, but the ramifications appear to be connected by, and enveloped with, a fine transparent membrane: behind the tentacula two black eyes are very evident; beneath these a pink spot was observed to be moveable beneath the skin: the colour is whitish, with a reddish-brown

line

line on each side of the back; between these lines, the dorsal ridge and the peduncles are spotted with the same: vent on the right side.

Length scarcely a quarter of an inch. Amongst fuci, on the coast of Devon: rare.

This elegant little animal would probably be considered by the French naturalists to belong to the same genus as the last; but the tentacula not appearing to be retractile, and its being destitute of anal plumes on the back, together with the disposition of the lateral appendages, lead me to consider it as constituting a link between the *Tritonia* and the *Scyllæa*.

It has been often a matter of wonder, why these and many other similar aquatic Vermes should be furnished with such ramified or fasciculate appendages, which, to a common observer, seem to be destitute of use; but, by the assistance of modern philosophy, we are led to believe that they are of such essential service as to constitute the principal agent of vital action, being to them what pulmonary organs are to terrestrial warm-blooded animals and some others, but peculiarly constructed for the separation of oxygen gas or vital air, from the medium in which they reside; and thus, like the gills or respirative organs in fishes, constituting their principal branchiæ or breathing apparatus.

Spio crenaticornis.

Tab. XIV. Fig. 3. a.

Spio filicornis. *Gmel. Syst.* vi. *p.* 3110?

Body slender, much resembling that of a *Nereis*, tapering a little, and furnished with about sixty joints, terminating posteriorly with two short styles; the joints are furnished with peduncles and fasciculi; upon the upper part of the former are long cirri standing erect, with their points usually reflecting over the back,

back, and nearly meeting those on the opposite side: the two tentacula are not quite filiform, but taper a little, and are articulated, or furnished with numerous joints, which gives them a crenated appearance; their length is nearly half as long as the body: between the tentacula, but generally obscured by them, are four black eyes, placed in pairs: on the front of the head is a short bifid snout, connected at the base.

The tube or case in which these animals reside is extremely tender, composed of minute adventitious matter slightly agglutinated together; it is usually attached to *Sertularia.* Like most of the *Amphitrites*, the body of this animal is concealed within its tube, and the feelers or tentacula alone are displayed; and these are in constant motion, being thrown about in all directions, though they are capable of instantaneous contraction. When the animal had been divested of its covering, and suffered to be quiescent, the tentacula were generally coiled up spirally, and then appeared much wrinkled. The largest I have observed did not exceed half an inch independent of its feelers; the colour is pale, with pink cirri.

This species, which is not an uncommon inhabitant of our coasts, is without doubt a *Spio*, although it does not strictly accord with the Gmelinean characters, being possessed of four eyes: to this family the *Polydore cornue* of Bosc, *tom.* i. *pl.* 5. *fig.* 7. belongs, by reason of the same number of eyes; in other respects it does not sufficiently correspond with the present subject to induce an opinion that they are the same species. In some respects this appears to be somewhat allied to *Spio filicornis*, but I have referred to it with considerable doubt.

Medusa

Medusa pocillum.

Tab. XIV. Fig. 4.

Body campanulate, furnished on the top with a sub-ovate, flat, and extremely thin striated crest or sail. The cup is whitish, with a broad striated border of purplish-brown, margined with bright blue; the edges crenulated: within the cup are about ten larger sub-clavated tentacula, and many intermediate smaller ones of a fine dark blue colour, which surround a central aperture.

Length, including the crest, about three lines. Coast of Devonshire.

This exquisitely beautiful little animal was discovered on a piece of *Spongia*, where it attracted the eye by its brilliant colour. When placed under a microscope in sea water, it was observed to float on the surface reclining, so that the crest was never erect above the water; but it was doubtless in a relaxed state, having been carried some distance for examination.

Whether the flat appendage in such a small *Medusa* can be of any use as a sail, to give it progressive motion by means of the wind, is very doubtful; but, like the dorsal fin of a fish, it must be most essential to keep it upright in the water. It evidently moved the crest or fin as well as the tentacula, and by their joint efforts obtained a slow progressive motion. The longer tentacula were seen to move to and from the central mouth.

To this crested or finned division of *Medusa* belong the *Medusa Velella* and the *Holothuria spirans* of Gmelin; the former of which is the *Velelle tentaculée* of Bosc, figured in *Histoire Naturelle des Vers*, tom. ii. But those who wish to make a comparison we refer to the coloured figures of these two species in *vol.* vii. *Nat. Miscel. tab.* 247 and 250. Both these *Medusæ* are ovate in the cup, and not orbicular as in the present species.

VERMES INTESTINA.

Branchiarius.

Body irregular, sub-pellucid, destitute of eyes, tentacula, or any other appendage, but distinguished by lateral branchiæ.

It has fallen to my lot to discover several species of marine Vermes that belong to the same family, but which differ so essentially from any thing that characterizes the present formed genera within my knowledge, that I have ventured to place them by themselves under the title annexed. As a specimen I have selected the following.

Branchiarius quadrangulatus.

Tab. XIV. Fig. 5.

Body long, nearly of equal size throughout, quadrangular, and furnished with tubercles along the angles; the sides with branchiæ; both the extremities are truncated, that of the anterior quadrilobated: the colour is pale orange, with two rows of curved black spots, one along each side; these in the contracted state of the animal appear like lineations, but when extended are observed to be distinct on each articulation.

Length exceeding two inches.

This species has but rarely occurred on the south coast of Devon, and its history is of course imperfectly known. I first discovered it amongst fuci at low water, destitute of any covering; but as the locomotion of all the species hitherto noticed is extremely limited, their principal action consisting of bringing the two extremities together, and straightening alternately, it may be presumed that they form some case or covering for protection.

Their

Their general appearance has a strong resemblance to some of the naked larvæ of winged insects.

Diplotis.

Body gelatinous, anterior end truncated, from which issue two auricular appendages; posterior end acuminated: mouth small.

Diplotis hyalina.

Tab. XIV. Fig. 6, 7.

Body taper from the anterior to the posterior end; the front truncated, and furnished with two earlike projections pointing forwards; these are also truncated and concave, the margin ovate and purple, the concavity orange with a central dark spot: beneath these, at the lower extremity, the mouth is situated, which is small, and a little protruded: along the sides is a faint line forming a slight angle with the under part of the body: the back is a trifle convex; the sides and belly are wrinkled: the posterior end is pointed and slightly tridentate. The colour is hyaline, with a few undulating intestinal markings of a yellowish appearance.

Length half an inch. Devon coast: rare.

This is another Vermis of the order *Intestina*, which cannot be referred to any one of the present genera. In its general appearance there is so much resemblance to the larva of some insect, that, had any such ever been known to undergo their transformation in the marine element, some suspicion might have arisen with respect to the rank to which it should be consigned. But besides there being no well authenticated account of any insects changing their form in sea water, the situation in which this animal was found would be the strongest evidence of its marine origin.

 REFE-

REFERENCES TO THE FIGURES.

TAB. XII. *Fig.* 1. Lepas cornuta.
2. Lepas membranacea.
3. Lamellaria membranacea.
4. Shell of the same, or Bulla membranacea.
5, 6. Lamellaria tentaculata.

TAB. XIII. *Fig.* 1. Mya striata—A. the tooth.
2. Terebratula Cranium—B. the tooth.
3. Turbo zetlandicus, magnified.
4. Turbo dispar.
5. Patella distorta.

TAB. XIV. *Fig.* 1. Doris pedata, magnified.
2. Doris bifida, magnified.
3. Spio crenaticornis—two segments more highly magnified.
4. Medusa pocillum, magnified.
5. Branchiarius quadrangulatus.
6, 7. Diplotis hyalina, magnified.
8. &c. Cancer salinus. See page 206.

Weddell, Sculp^t

Weddell Sculp.

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XIV. *Observations on Cancer salinus. By the Rev. Thomas Rackett, F.R.S. and L.S.*

Read June 16, 1812.

As it is one of the objects of the Society to obtain information respecting such subjects of Natural History in our own country as have been but slightly noticed, I beg leave to present a drawing of *Cancer salinus*, commonly known by the name of "The Lymington Shrimp or Brine-worm," of which no figure has yet been given by any author.

Linnæus describes it as follows:

C. *salinus*, macrourus articularis, manibus adactylis, pedibus viginti patentibus, cauda subulata. *Linn. Syst. Nat.* ii. *p.* 1056. *Linn. Syst. Gmel.* 2993.
Maty Diar. Brit. 1756.
Fabr. Entom. Syst. ii. *p.* 518. *Gammarus salinus.*
Penn. Brit. Zool. iv. 22. *n.* 35.
Herbst ii. *p.* 145.
Pallas It. t. 2.

Habitat in Angliæ salinis Lymingtonianis; Sibiriæ lacubus salsis.
Corpus pediculo majus, oblongum. *Oculi* distantes laterales, pedunculati. *Antennæ* setaceæ, corpore breviores. *Cauda* filiformi-subulata, exserta, longitudine corporis. *Pedes* utrinque 10. patentes et quasi pinnatim digesti.

Gmelin adds, nunc oculis prominulis globosis atris, ovarioque utrinque ovato, nunc oculis nullis, pedibus anticis porrectis cheliferis, an potius *Monoculus*?

It

It seems, however, to correspond better with the generic characters of the genus *Cancer* than those of *Monoculus;* and indeed among some hundreds I have never observed an individual destitute of two eyes.

Myriads of these animalcula are to be found in the salterns at Lymington, in the open tanks or reservoirs where the brine is deposited previous to the boiling. It attains the desired strength by evaporation from exposure to the sun and air in about a fortnight. A pint contains about a quarter of a pound of salt; and this concentrated solution instantly destroys most other marine animals.

These tanks are called clearers, as the liquor becomes clear in them; an effect which the workmen attribute in some degree to the rapid and continual motion of the Brine-worm, or to the particles which cloud the liquor serving for its food; but this is mere conjecture. So strongly persuaded, however, are the workmen of this fact, that they are accustomed to transport a few of the worms from another saltern, if they do not appear at their own. They increase astonishingly in the course of a few days.

It is observable that the Brine-worm is never found in the sun-pans, where the brine is made by the admission of sea-water during the summer, and which are emptied every fortnight, but only in the pits and reservoirs, where it is deposited after it is taken out of the pans, and where some of the liquor constantly remains. When it becomes much diluted with rain-water, from October till May, (during which time the manufacture is at a stand,) a few only of the worms are visible; but at the approach of summer young ones appear in great numbers.

Tab. XIV. *Fig.* 8. represents *Cancer salinus* of the natural size.
9. the same magnified.
10. one of the legs considerably magnified.

XV. *De-*

XV. *Description of the Corvus leucolophus, or white crowned Crow of India, in a Letter to Aylmer Bourke Lambert, Esq. F.R.S. and A.S. V.P.L.S. By Lieut-Colonel Thomas Hardwicke, F.L.S.*

Read December 1, 1812.

SIR,

IN moments of leisure I occasionally give my attention to the collection of drawings which I formed during a long residence in the East Indies; and as I am induced to believe some subjects among them belonging to the animal creation are not to be found described in any publication extant, which has yet fallen under my observation, I shall, with permission, when I meet with such as bear the marks of novelty, offer them to the Society for examination, and to be disposed of according to its opinion and judgement.

The subject I now have the honour to submit to the Society is a bird of the genus *Corvus*. In referring it to this genus, however, it is with deference to higher authority, and I believe in coincidence with the opinion of the ablest living Ornithologist, Dr. Latham.

The first inspection of the figure may suggest the propriety of calling this bird

CORVUS

CORVUS LEUCOLOPHUS.

The white crowned Crow.

C. cristatus cinereo-fuscus, capite collo pectoreque niveis, loris temporibusque atris.

TAB. XV.

It is about the size of a jackdaw; in length from tip of the bill to the end of the tail eleven inches three quarters.

Bill sub-conical, the upper mandible convex, both of equal length, with sharp edges; in length one inch three-eighths, very strong, and black.

Nostrils rather high, with short stiff black feathers procumbent on their margins, but not covering them: near the angles of the mouth a few long bristly feathers projecting forward.

Plumage of the head, neck, throat and breast a beautiful white; the feathers of the head rising from the front into a fine crest, and gently bending backwards: the body, wings and tail of uniform ferruginous brown, excepting a narrow line of a lighter brown, which terminates the white towards the body: from the nasal apertures a black line, of about half an inch in breadth, of short feathers extends backwards as far as the auricles, including the eye, and passing in a narrow arched margin over it.

The tail nearly the length of the body, feathers equal, and rounded at their ends.

Legs cinereous; claws black, strong, and much bent, the posterior claw largest.

This bird is a native of the forests in the mountains above Hurdwar, and noticed in my Journey to Sireenagur in 1796. They are found in numbers from twenty to fifty. When assem-

bled

Corvus leucolophus.

Weddell Sculp[t]

bled in these parties, the noise they make is more remarkable than that of the magpie, and so closely resembles the human voice in loud laughing, that it cannot fail to draw the attention of the traveller when within the hearing of them. This singularity might afford no bad specific distinction; and perhaps the Society may think the Laughing Crow as appropriate a name as that which I have given.

It feeds on fruits of the forest. The drawing was made from a living bird, and is of the natural size.

I have the honour to be, &c.

Wisbech,
Nov. 19th, 1812.

THOS. HARDWICKE.

XVI. *Some*

XVI. *Some Account of the Trichiurus Lepturus of Linnæus, found on the Shore of the Moray-Frith.* *By Mr. James Hoy, F.L.S.*

Read February 16, 1813.

On the 2d of November 1810, after a high wind from the north, a specimen of the *Trichiurus Lepturus* of *Linn. Syst. Nat.* i. *p.* 429, was cast upon the shore of the Moray-Frith, near the fishing village of Port Gordon, about three miles east from the mouth of the River Spey; and it was brought to me the next day as a kind of fish which had never been seen before by any of the fishermen in this part of the country. They said that, in seeking for lobsters cast ashore by the storm, they found it lying dead upon the sandy beach. Its head was much broken, probably by being dashed upon the rocks about low-water mark: the bones of the upper part of the head still remained, and the sockets of the eyes were distinguishable, very near to each other: the extremity of the upper jaw, or upper part of the mouth, was entire; upon either side of which was an *operculum.* The length of the head could not be measured exactly, but was about eight or nine inches: the body, from the gills to the point of the tail, was three feet two inches long; its greatest breadth six inches and a quarter; and its greatest thickness only an inch: the vent was two inches from the gills; these were much broken, and partly gone, so that the number of the rays could not be ascertained. Both sides of the fish were wholly white, without a spot upon them;

them; the dorsal fin was the only part of a different colour, being a blackish green: this fin ran all along the back from the gills to the tail, consisting of a great number of rays, soft, and little more than an inch long. Each of the pectoral fins had six double rays. There were no ventral nor anal fins; but the belly was a sharp, smooth, and entire edge. The tail ended in a point, consisting of three or four soft spines or bristles of different lengths, not exceeding two inches. The body was nearly of the same breadth for one half of its length, and then its breadth diminished gradually till within three inches of the tail, when the diminution became more quick. The lateral line was straight, and strongly marked along the middle of the two sides.

This was the first individual of the genus *Trichiurus* (as far as I know) that had ever been found on the British coast. But although the fishermen have not found out the means to catch them, it now appears that these fish inhabit our seas; for upon the 12th of November 1812 another of them was found on the beach, hard by the same fishing village as the former, but of a much larger size; it was brought next day in a cart to the Duke of Gordon, at whose desire I made the following observations:

Its head had been broken off, and was quite gone, a small bit of the gills only remained about the upper part of the throat; from whence to the extremity of the tail its length was twelve feet nine inches: its breadth, eleven inches and a quarter, was nearly equal for the first six feet in length from the gills, diminishing gradually from thence to the tail, which ended in a blunt point, without any of those kind of bristles which projected from the tail of the one found formerly: its greatest thickness was two inches and a half. The distance from the gills to the anus forty-six inches. The dorsal fin extended from the head to the tail, but was much torn and broken: the bones or muscles, to which the

 pectoral

pectoral fins had been attached, were perceivable very near the gills. There were no ventral nor anal fins; but the thin edge of the belly was closely muricated with small hard points which, although scarcely visible through the skin, were very plainly felt all along it. Both sides of the fish were white, with four longitudinal bars of a darker colour; the one immediately below the dorsal fin was about two inches broad; each of the other three about three-fourths of an inch. The side-line straight along the middle.

As the fish appeared to be very fresh, a cut of it was boiled, which I tasted, and found to be very good, approaching nearly in taste to the *Anarhichas lupus*, which I had an opportunity of tasting only a few days before.

Gordon Castle,
January 9, 1813.

XVII. *On*

XVII. *On the Deoxidation of the Leaves of Cotyledon calycina; in a Letter to A. B. Lambert, Esq., Vice-President of the Linnean Society.* *By Benjamin Heyne, M.D. F.L.S.*

Read April 20, 1813.

Dear Sir,

I had an opportunity some time ago of mentioning to you a remarkable deoxidation of the leaves of a plant in day-light. As the circumstance is in itself curious, and throws great light on the opinion of those celebrated philosophers who have written on the subject, I will state it shortly in this letter, which if you please, you may in extract, or in any other way you think proper, lay before the Society.

The leaves of the *Cotyledon calycina*, the plant called by Mr. Salisbury *Bryophyllum calycinum*, which on the whole have an herbaceous taste, are in the morning as acid as sorrel, if not more so; as the day advances, they lose their acidity, and are tasteless about noon; and become almost bitterish towards evening. This is the case in India, where this plant is pretty generally cultivated in our gardens; and it remains to be seen if the same takes place in the hot-houses in England, where it has been lately introduced.

I have seen this plant but once in this country, and that was at Mr. Loddiges', at Hackney, about twelve o'clock in the day-time, when I found it quite tasteless. The distance of that place from

 my

my habitation has hitherto prevented me from attending to it at an earlier hour in the morning. I have, however, but little doubt it will be found as acid as I have described it to be in India.

I need scarcely observe, that the acidity which these leaves possess in the morning cannot be ascribed to any thing else than to the oxygen which the plant has absorbed during the darkness of the night, or which has been transferred from other constituent principles of the plant during that period. I think it has been absorbed, as it is so loosely united to its base, that even the light of the day has an immediate effect of disengaging it again.

Both Priestley and Ingenhousz have concluded, from numerous experiments, that all plants exhale vital air in the day-time, and fixt air or carbonic acid gas during the night; but these conclusions have been called in question by some, from the various results of experiments since made on this subject. What I have now related is therefore not destitute of interest, as it seems incontrovertibly to establish the theory of these celebrated philosophers.

I was in hopes of learning something new or pertinent on this interesting subject in Sprengel's work on the Structure and Nature of Plants: but, to my great disappointment, there is nothing to be found but what has been advanced by the two philosophers just mentioned, and by Saussure and Sennebier in later times.

Sprengel expatiates much on the exhalation and absorption of carbonic gas, and only once mentions oxygen, when he notices Sennebier's observations; according to which, more carbonic gas is exhaled by plants during the night in close vessels, than there is oxygen disengaged in sunshine.

I beg leave further to observe, that the plant above treated of is, in my opinion, truly a species of *Cotyledon*, with which it perfectly

agrees

agrees in habit and generic characters; the only difference being in the number of the parts of fructification, which in *Cotyledon calycina* are one-fifth less than in the other species of the genus; a difference, however, that according to the principles of the Linnean System, does not form a sufficient ground for separation.

I have the honour to be, &c.

20th April, 1813. BENJAMIN HEYNE.

XVIII. *De-*

XVIII. *Description of a new British Rubus, with Corrections of the Descriptions of Rubus corylifolius and fruticosus; and a List of some of the more rare British Plants.* *By George Anderson, Esq. F.L.S.*

Read April 20, and May 4, 1813.

The study of Botany in this country, with a few eminent exceptions, seems of late years to be chiefly directed to the investigation of our own native productions; at least we must own that the spirit for importing new foreign plants, and for keeping up and increasing our collection of exotics, if it has not declined, does not keep pace with the increasing wealth and power of the country, or with the rank it holds among European nations. And although the lovers of Botany have to acknowledge the liberal patronage of some individuals of high rank, still they have cause of regret in finding the number among the rich and great, who give encouragement to the advancement of knowledge in Exotic Botany, so limited as it is.

Our much respected Ray was among the first who introduced a taste for inquiry into the indigenous plants of England; and from his time the fashion for this branch has gradually and progressively increased as a favourite object of pursuit down to the present day, in which we see it so industriously followed by a great number of good botanists; and so greatly has the spirit for discovery prompted us, that one would think there was scarcely a hill or a rock in the kingdom left unexplored, were it not for the fresh

fresh discoveries almost daily made. The accession of new species to our catalogue, even since the days of Hudson, is indeed truly surprising to ourselves; how much more remarkable must it be to the foreign botanist to observe how large a share of the plants hitherto known inhabits so small a portion of the globe as the British isles! What a store of unknown treasures may other countries still possess, when our little spot, through careful examination, is found to furnish so numerous a list of vegetable productions!

I have been slow in bringing forward the plant, of which I now beg leave to offer an account, to the Linnean Society; having waited till I had known and cultivated it for several years, and found it wild in most of the hilly regions of the kingdom; nor do I even yet venture to pronounce it undoubtedly a permanent and unchangeable species. Contenting myself with describing the plant as it has been found and continued unaltered, I shall leave it for future investigators, who may think it worth their while to examine and decide whether the account I give of it remain steady or not.

In many of the genera which comprehend numerous species, an accurate observer will discover a closer alliance to exist between two or more of those species, than does between them and any others in the same family. These inferior divisions of the genus are for the most part the produce of late years, and have chiefly arisen out of the improvement or refinement of the science since the writings of Linné; being, in the greater number of instances, comprehended under one species by him. The *Rubus corylifolius* of Smith, &c. was not distinguished by the writers of those days from *R. fruticosus,* though it seems not to have been overlooked by the accurate Ray about 100 years ago. The plant described below is another branch from the same stock,

but

but has not been observed till now by any botanist in this, or, as far as I can discover, in any other country, with the exception of the quotation below. Though materially different from each other, they are all three nevertheless more nearly connected together than any of them are to the *Rubus cæsius* on the one side, or *idæus* on the other, the two species between which they stand. I have patiently examined them in their different stages, to fix permanent and scientific marks of distinction to characterize them; and in this attempt have endeavoured to improve the descriptions of the two species already defined by Dr. Smith, having his judicious remarks to guide me, and such further aid as a constant view of the plants for several years has afforded me.

1. Rubus *suberectus.*

Spec. Char. Rubus foliis subquinatis septennato-pinnatisque: foliolis ovatis subtus pilosis, caulibus erectiusculis: aculeis exiguis rectiusculis.

Tab. XVI.

Rubus Nessensis. *W. Hall in Trans. Roy. Soc. Edinb.* iii. *p.* 20, 21.

DESCR. Caules biennes erectiusculi, (sine sustentaculo) adscendentes teretes vel angulati, fragiles, rubicundi, ramis divaricatis; sparsim aculeati, interdum fere inermes; aculei breves rectiusculi. *Folia* quinata vel septennato-pinnata, subinde ternata; foliolis ovatis apice acutis, læte viridibus, inæqualiter serratis; supra glabris, læviusculis, subtus pilosis. *Panicula* laxiuscula. *Corolla* alba. *Fructus* atrorubens gratissimus acinis paucis.

Found by me first in autumn 1808, in the wood behind the Devil's Bridge, Cardiganshire; afterwards in other parts of Wales. I was not then aware of its being the same plant that was brought by Mr. Hall from the banks of Loch Ness, and so accurately described by him in the Transactions of the Royal Society of Edinburgh, which I had seen in Scotland twenty years ago; and which without examination I was taught to believe was a mere variety of

Weddell sc.

of *Rubus fruticosus.* I discovered it a second time in 1811, in Dallow Gill, near Ripley, Yorkshire; and again last autumn in the Highlands of Aberdeen and Perthshire in great abundance and variety: I also brought a plant of it from the garden of the indefatigable Don, at Forfar, three years ago, which is now alive in my garden at West Ham, along with other plants of it from Aberdeenshire. Don found it on the hills of Forfarshire. I find a specimen of it in the Banksian Herbarium, sent from four miles north-west from Manchester; so that I have reason to believe it is not of rare occurrence, growing chiefly among loose stones, by way sides, or at the foot of rocks in upland exposed situations.

The habit of the plant approaches nearest to that of *R. corylifolius,* with which it is frequently intermixed in those districts, in the same way as the latter is found with *R. fruticosus* in the neighbourhood of London. It differs in being more upright in its branches; in the leaves having often seven leaflets, (never the case with the other two,) which are generally more acuminated, and smoother on the upper surface; the undermost and uppermost pair sessile; in the aculei being more rare and shorter; and in the fruit being dark red, not dark purple. Its taste resembles a little that of *R. idæus.* It perhaps might not be unworthy of cultivation, as its period of ripening is later than that of the raspberry. The whole plant bears in general a darker hue than that of *R. corylifolius.*

The impropriety of Mr. Hall's specific name will I hope be a sufficient excuse for my changing it; the plant having never yet appeared under it in any botanical work.

2. RUBUS *corylifolius.*

SPEC. CHAR. Rubus foliis subquinatis: foliolis ovatis subtus pilosis, caulibus teretiusculis diffusis promiscue aculeatis: aculeis rectiusculis.

SYN. Rubus corylifolius. *Smith Flo. Brit.* 542. *Relhan, Cant. ed.* 2. 195. *Eng. Bot.* 827; a good figure.

R. fruticosus major. *With. ed.* 3. *p.* 469.

R. major fructu nigro. *Schmidel Ic. tom.* 8; an excellent figure.

DESCR. Caules biennes, longissimi, flagelliformes, diffusi, procumbentes, vel per dumeta aut sepes sustentati, fragiles et spongiosi, rubicundi, teretiusculi, raro subangulati, extremitatibus radicantibus; ubique aculeati, aculeis inæqualibus, gracilibus, rectiusculis. *Folia* ternata vel quinata; foliolis late ovatis, planiusculis, rugosis; nervis aculeatis, undique pilosis, subtus mollibus, inæqualiter serratis. *Petioli* aculeati, imis brevissimis. *Panicula* laxiuscula. *Corolla* alba. *Fructus* atro-violaceus hemisphæricus vel difformis grate acidus; acinis paucis, magnis, rotundatis. *Calix* fructus reflexus.

Common among ditches and sides of fields about London, and indeed all over the island, trailing along the ground, though sometimes arching upwards; and when supported by a hedge or pollard, will grow to a great height. I have seen shoots of it in such situations eighteen or twenty feet high. Dr. Smith, in *English Botany*, has corrected one mistake that crept into *Flora Britannica* from misinformation; but has left another still undetected; the leaflets being all petiolated, although the lowermost pair are much shorter in the petioles than those of *R. fruticosus*; and the calyx of the fruit is reflexed as in *fruticosus*, but larger. Indeed the whole of Mr. Wigg's original description seems to refer to another plant very common also about London, but not yet separated from *R. cæsius*, though apparently very distinct from it. I brought this last-mentioned plant four years ago from Charlton Wood, and have cultivated it ever since in my garden in company with the true *cæsius*. I have since found it to be very common at the edges of cultivated fields in Essex, with long trailing shoots quite cylindrical; its leaves as often of five leaflets as three, and the undermost pair of the five quite sessile, and with the calyx inflexed.

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The only steady scientific mark of distinction between the present plant and *R. fruticosus*, that will carry the observer fairly through the many varieties of each species, notwithstanding their general appearance being so dissimilar, is that of the shoots of *R. fruticosus* being constantly placed on the *ridge* of the angle or furrow; whereas those of *R. corylifolius*, besides being more slender, more numerous, and of irregular size, are indiscriminately scattered all over the shoot, which is generally round, rarely angled, and more spongy and brittle than in *fruticosus.*

The panicle of *R. corylifolius* is also more diffuse; fruit not so numerous, hemispherical, acini larger, fewer in number, and more distinct, not crowded together and flattened on the surface as if pressed down by a plane, as is the case with *R. fruticosus.*

The aculei of *R. corylifolius* are generally straight, not hooked as in *fruticosus;* but this distinction is not invariably preserved by either species.

Relhan's remark of this species (*flagellis non radicantibus*) is by no means correct; the tips of the shoots are prone to take root in common with those of *R. fruticosus*, and indeed every other woody British species, except *sub-erectus* and *idæus.*

3. RUBUS *fruticosus.*

SPEC. CHAR. Rubus foliis subquinatis: foliolis petiolatis subtus cæsio-tomentosis, angulis caulium aculeatis: aculeis aduncis. Rubus fruticosus. *With.* 469. *Smith Flo. Brit.* 543. *Relhan, ed.* 2. *p.* 195. *Eng. Bot.* 715; an excellent figure.

DESCR. Caules bi- vel triennes 4- ad 6-pedales lignosi, fortes, arcuati, divaricati, interdum ad humum deflexi, hinc radicantes; tenaces, præcipue angulato-sulcati, angulis aculeatis, (sulcis intermediis semper inermibus) aculeis caulium basi dilatatis seu compresso-conicis, subaduncis; pedunculorum et foliorum plane aduncis: rami annotini cæsio-rubicundi. *Folia* quinata vel ternata; foliola omnia petiolata, petiolis aculeatis; anguste ovata, seu elliptica, basi præcipue an-

 gustata,

gustata, apice obtusa cum acumine, inæqualiter serrata, raro incisa, scabro-rugosa, supra convexa, subnuda, saturate viridia; subtus cano-tomentosa, nervis aculeatis. *Panicula* subracemosa multiflora, calyx fructus reflexus marcescens. *Corolla* rosea, raro alba. *Fructus* atro-violaceus, subdulcis, orbiculatus, acinis numerosis, confertis, seu connato-compressis.

Common in ditches and on way-sides about London, but seems to prevail less in the northern parts of the kingdom. It was no where to be found by me in Aberdeenshire or Perthshire, giving place as a companion to *corylifolius*, in those counties, to *R. sub-erectus.* This is by far the most robust of the three species, though not so uniformly upright as *sub-erectus*, throwing up long, vigorous, arched, tough branches, seldom trailing on the ground as in the preceding species; armed with terrible prickles, proportionate in size to the branches, dilated at the base, firmly fixed on the shoot, and for the most part hooked; particularly those of the minor branches and petioles.

Leaflets narrower and much less pubescent, with longer petioles, clothed underneath with an imperceptible hoary down, that gives it a whitish appearance (though it varies in this particular, for I have seen plants with leaves nearly equally green on both sides). Convex or rounded on the upper surface, and doubly or irregularly serrated, but more entire as well as more attenuated at the base than in the preceding plant.

The leaves of this species have a tendency to remain all winter on the branches, and seem more frequently quinate than ternate; those of *corylifolius*, on the contrary, more ternate than quinate, and drop off in the autumn, excepting in shady situations.

This species and *R. corylifolius* are subject to vary widely: the above remarks must therefore be viewed on a general scale; the only constant mark of distinction yet discovered being in the situation of the prickles, as mentioned in describing the foregoing species.

The

The difficulty that has hitherto attended their discrimination will, I trust, be an apology for my giving such minute descriptions of plants so very common as the two last; and I have thought it necessary to accompany this with a drawing of the shoot and leaf of *suberectus*. Tab. XVI.

I shall conclude these remarks by subjoining a list of the places of growth hitherto unrecorded of a few British plants which I have fallen in with in my late excursions. It may prove not unacceptable to some of the members of the Society.

Arabis hispida, var. *hastulata*, on the banks of the Dee, Aberdeenshire.

Meum athamanticum, do.

Festuca bromoides, abundant about Aberdeen and the banks of the Dee.

Prunus Padus, all along the banks of the Dee, and very common in Yorkshire.

Rosa rubiginosa, on the banks of the Dee, undoubtedly wild.

—— *cæsia*, on the banks of the Den of Lawers, Perthshire, and many other parts of that county.

—— *mollis*, *E. Bot.*, on the banks of the Dee; on Strath Avon, Banffshire; and near Durness, Sutherland. When I found this and the preceding, I was not aware that they had been previously published; and it is gratifying to find that, on comparing my descriptions of them made upon the spot, under the conviction of their being non-descript species, with those in *English Botany*, they correspond in almost every particular.

—— , a plant very common along the banks of Dee, the Tilt, Tummel, Lochs Tay and Rannoch; allied to *villosa*, indeed

indeed I have little doubt of its being only a variety of that species with smooth capsules.

Rosa rubella, Eng. Bot. 2459, on the banks of Dee, about Abergeldy. I took this for a new species when on the spot, but afterwards concluded it was only a dwarf red-fruited variety of *R. spinosissima.*

Pyrethrum maritimum, sea-shores about Aberdeen.

Carex pulla, banks of the Tilt, Perthshire.

Gnaphalium supinum, Glen Dee.

Juncus trifidus, on Bræ Riach, at the head of Dee.

Stellaria cerastoides, on Cairn Toule, do.

Veronica alpina, do. do.

Eriophorum capitatum Eng. Bot. 2387? Is this Schrader's plant?

Senecio sarracenicus, on the banks of the Eningteer, a tributary to the Don, Aberdeenshire.

Carduus heterophyllus, on the river Galater, head of Dee, Ben Clibrig, Sutherland.

Berberis vulgaris, at the lower end of Loch Tay.

Serratula alpina, Craig Cailloch, Perthshire, Ben Clibrig.

Thalictrum majus, banks of Loch Tay and Loch Rannoch; the roots of this species are remarkably yellow.

Vicia sylvatica, banks of Loch Rannoch.

Geranium sanguineum, do.

Myosotis alpina? a perennial on Ben Lawers, with exquisitely bright blue flowers, nearest allied to *M. palustris, Eng. Bot.*

Arbutus alpina, supplies the place that *A. Uva-ursi* generally has, on almost all the high mountains of Sutherland.

Draba incana, Eng. Bot. at Durness, Sutherland, and on Ben Lawers; the figure in *English Botany* is of an unusually luxuriant specimen.

Linnea borealis, discovered (but not by me) in fir woods at Craib-

stone,

stone, about six miles from Aberdeen; this is the third station in which it has been found thereabouts, to my knowledge.

Epilobium angustifolium, Ben Clibrig, Sutherland, banks of the Tilt, Spey and Dee. The beautiful banks of Loch Lubnaig, Perthshire, are red with its flowers. It seems very common in most alpine situations.

Spiræa salicifolia, sides of fields about Pitcaithly, Perthshire, and in woods on the banks of Alt-Graad, Frith of Cromarty.

Tormentilla reptans. I brought a plant from Wales four years ago, and have cultivated it ever since in my garden; it flowers with four and five petals promiscuously, and seems equally akin to this and *Potentilla reptans.*

Sedum rupestre. It was suspected that *S. Forsterianum* would supplant this species as a Welsh plant; but I found the true *Sedum rupestre* on rocks behind Tre-Madock, North Wales. I have also found it on Chedder cliffs, and on rocks near the sea, south of Minehead, Somerset; in all which places I also gathered *S. Forsterianum.*

Vinca minor. I cannot help differing with Dr. Smith, who thinks this the more rare species of the two, as I have found it truly wild in Wiltshire, and near Copthorne Common, Sussex; also in woods near Chisselhurst, and near Wrotham, Kent; whereas I have never seen *V. major* but in suspicious places, though frequently to be seen in hedges in the vicinity of cottages: indeed I consider it quite a doubtful native.

Fucus Mackaii, Turner's Fuci, No. 52. Eng. Bot. 1927; discovered in 1809 by me in the sea lakes, Loch Laxford and Loch Inchard, Sutherland, floating on the surface of the water in great abundance. This I believe is the only instance of that species being found in Britain.

Poa

Poa humilis, *Flo. Brit.*, and *subcærulea*, *Eng. Bot.*, at the Farout head, Durness, Sutherland; in Anglesea, and other places. I am however of opinion that this is only a variety of *Poa pratensis*, as there are no permanent distinguishing characters, and I have observed many intermediate steps of variation between them, in as far as regards their difference of habit.

I purposely avoid taking notice of the Willows I have collected from various quarters, as I wish to make myself better acquainted with that very intricate genus before I venture to give out any remarks upon it; or, if I cannot succeed in establishing some more satisfactory method of arranging it than hitherto has been effected, to remain silent. Having, however, engaged myself in the undertaking, I should feel obliged for such communications as any of the members of the Society may have it in their power to favour me with on the subject.

G. A.

XIX. *Some*

XIX. *Some Observations on Iris susiana of Linnæus, and on the natural Order of Aquilaria. In a Letter to Alexander Mac-Leay, Esq. F.R.S. Sec. Linn. Soc. By Sir James Edward Smith, M.D. F.R.S. P.L.S.*

Read June 16, 1812.

Dear Sir,

Disappointed in my last hope, of the pleasure of attending the concluding meeting, for this season, of the Linnean Society, which the state of my health has rendered impracticable, I am still unwilling that the meeting should pass by without some testimony of remembrance on my part, however trifling may be what I have to communicate. My botanical observations have been of late confined to my own very small garden, but no theatre is too confined for a person who wishes to use his eyes with attention. The *Iris susiana* of Linnæus, or Chalcedonian Iris, which has flowered very finely last week, has suggested some observations, with which I will now venture to trouble you. I know not how this species came to be mentioned in the *Hortus Kewensis* as blossoming in March and April. I have never seen its flowers but in the early part of June, and during a very short period, perhaps ten days, only.

There appear to be two distinct varieties, if not species, comprehended under the above name. One of these is *Iris susiana major variegata*, of Swertius' *Florilegium, tab.* 38. *f.* 2. This is figured in Curtis's Magazine, *t.* 91, tolerably well, though the colouring

colouring gives but an inadequate idea of the solemn magnificence of the original. It is moreover the plant of the Linnæan herbarium, and the only kind I have ever seen in our gardens.

The other is *Iris susiana latifolia minor, Swert. Floril. t.* 39, *f.* 1. This may be the *Iris susiana* of *Redouté's Liliacées, t.* 18, which is there drawn much smaller, as well as of a darker colour, than Curtis's plant. There is however an essential difference, if it be faithfully represented, in the plant figured by Swertius; its dependent petals being deeply lobed, which Redouté does not express, and which, if it be true, affords a specific distinction no less certain than extraordinary. It is much to be wished that this point could be ascertained by living specimens from France or from Turkey, or perhaps from some recluse old country garden in England.

But the matter which chiefly leads me to bring this *Iris* under your notice at present is its name, and reputed native country. Clusius, who first mentions the plant and justly celebrates it as the finest of its genus, relates, that being at Vienna in 1573, he received a root of this Iris from the Imperial Ambassador, then just returned from Constantinople, who sent others of the same species to his friends in Holland. These were brought from Constantinople under the name of *Alaja Susani*, and *Alaga Susam*, with an Italian inscription signifying that "the flower was elegantly pencilled with black and white, and had a good smell." "Hence," says Clusius, "as the name seems to indicate that it was brought from Susa, the capital of Susiana, to the gardens near Constantinople, on the other side the Bosphorus, I have called it *Iris Susiana*." This Curtis repeats, and Redouté thinks it necessary to inform his countrymen that "it does not derive its name from Susa in Italy."

Now I cannot help presuming that this conjecture of Clusius

is

is ill-founded. The name *Susam* or *Susani* appears to be the general Turkish appellation of an Iris, derived no doubt from the Hebrew *Susan* or *Schuschan*, a lily. Dr. Sibthorp mentions *Susen* as the Turkish name of *Iris germanica*, one of the most common and conspicuous species. The ancient town of *Susa* itself is indeed said to have owed its name to the quantity of lilies or flowers about it; but there is no authentic indication of the plant under our consideration, in particular, being one of them. On the contrary, its bearing our climate so well, never suffering, as far as I can observe, from any degree of cold experienced here, except accompanied by too much wet, leads us to presume it a native of a more northern latitude, and probably our English name, Chalcedonian Iris, is more near the truth. At least we may safely conclude that its Turkish denomination is no proof of its coming from Susa. With respect to the scent of this flower, I agree with Clusius, that no agreeable one is to be perceived about it. On the contrary, I have found a slight, but very perceptible fetor, in the fresh-gathered flower, chiefly at the orifices between the lower petals and the stigma, which recalls some idea of the *Stapelia* genus, and affords another instance, in addition to those already observed, of a coincidence between the colours, or at least the style of colouring, of some flowers and their smell.—I might add a few remarks on the true stigma of the Iris, concerning which some unfounded ideas, as I conceive them, of my late friend Cavanilles, are given in Sims and Konig's Annals of Botany, *v.* i. 412. But those ideas are abundantly refuted in the very same place, by the observations of Kölreuter and Sprengel, who surely have sufficiently shown the actual stigma to be in the cleft at the end of that petal-like expansion, which Linnæus called by this name, and which constitutes the peculiar generic character of *Iris*. This a very slight examination of the various

 species

species cannot fail to ascertain ; and the *I. susiana*, being large and distinctly formed, is one of the best for the purpose.

On another subject, quite unconnected with the above, I shall but slightly touch, and that rather in the form of an inquiry than a communication. Has any one ever adverted to the natural order of the *Aquilaria*, since Cavanilles and Jussieu published their very imperfect accounts of this genus ? I cannot but suspect it to belong to the *Euphorbiæ*. Dr. Roxburgh has lately sent me some seeds of this plant in their capsules, evidently the same as Cavanilles has figured, and I presume Sir Joseph Banks and others are supplied with them. The insertion of the parts, the nature of the little hairy tufts which are in the place of petals, and the configuration of the capsule, favour my opinion, which is strengthened by the acrid burning flavour of the seeds. As to its affinity to *Samyda*, I presume no one will support that opinion, nor does it appear on what grounds it has been advanced. I inclose two of the capsules, and shall be thankful for any information concerning them.

I remain, &c.

Norwich, June 15, 1812. J. E. Smith.

XX. *De-*

Psidium polycarpon.

XX. *Description of a new Species of Psidium. By A. B. Lambert, Esq. F.R.S. V.P.L.S.*

Read November 17, 1812.

I BEG leave to offer to the Society an account and a figure of a new species of *Psidium* which has ripened its fruit in my stove at Boyton this summer. The late celebrated Dr. Anderson of St. Vincent's, in his Catalogue of the Plants growing in the Botanical Garden of that Island, has named it *Psidium polycarpon;* and in a manuscript of his, in my possession, I find the following description.

PSIDIUM POLYCARPON.

TAB. XVII.

Psidium foliis ovato-oblongis acutis subcrenatis, suprà pubescentibus; subtùs rugosis scabris, pedunculis trifloris, ramis reclinatis.

Frutex vix tripedalis, ramosus. *Rami* elongati, graciles, reclinati. *Folia* ovalia seu ovato-oblonga, breviùs petiolata. *Pedunculi* axillares solitarii, interdum gemini, sericeo-tomentosi, apice dichotomi, 3-flori. *Flos* intermedius sessilis; laterales pedicellati. *Poma* subrotunda, congesta, parva.

This is a very small shrub, nearly three feet high, divided into a few long straggling branches, the lower ones lying on the ground, the upper bending towards it. The young twigs are round and

and hairy. The leaves have opposite footstalks; they are near five inches long, and more than two broad, of an oval-oblong form, with upward-curved ribs; smooth, with scattered hairs, above; rough and hairy beneath.—They cover the greater part of the branch, each pair one inch and a half distant. From the bottom of each comes out a short stalk, which supports three flowers, and they turn into as many round yellow fruits, the size of a large cherry, of a delicate taste, far superior to the common Guava.—The numerous fruits, when full grown, form a continued cluster on the greater part of the branch, which is bended to the ground by their weight. This species is indigenous to the grassy savannahs of Trinidad; from whence plants were sent to the St. Vincent's garden in 1792. It is seldom without fruit, and is propagated by cuttings, like the common Guava.

XXI. *Addendum to Strepsiptera* (*p.* 86.) *By the Rev. William Kirby, F.L.S.*

Read February 16, 1813.

Having received a clearly distinct species of *Stylops*, though in a very mutilated state, from Mr. George B. Sowerby, F.L.S. I am desirous of giving some account of it by way of appendix to my Paper on *Strepsiptera*, and shall begin by describing it as far as its condition enabled me.

Stylops tenuicornis

Aterrima, oculis subsessilibus, antennis tenuioribus piceis: ramis linearibus, alis nigricantibus.

Long. Corp. ½ lin. circiter.

A Dom. G. B. Sowerby Julio ineunti 1811, in Araneæ telâ lectus.

This species is not only much smaller than *Stylops Melittæ*, but it is also strikingly distinguished from it by its subsessile eyes and slender antennæ. From its mutilated state it was impossible to give a more detailed description.

In a specimen of the pupa of *Stylops Melittæ*, sent by the same gentleman for my inspection, the membrane for three-fourths of the length down the back appeared to be loose in the middle, and was divided into six segments by transverse impressed lines. This I imagine is the rugose part in Tab. IX. fig. 17.

When

When I claimed for Harris (see *note* * of p. 100 of this vol.) the honour of being the first who founded a system in some measure upon the veining of the wings of *Hymenoptera* and *Diptera*, I was not aware that Frisch could dispute it with him; but my friend and coadjutor Mr. Spence directed my attention to a note of M. Latreille's, (*Gen. Crust. & Ins.* iii. p. 226,) in which he has done me the honour to make me one of the trio, where he says, *Frisch, Harris, Kirby, &c. alarum reticulationem characteres genericos et secundarios exhibere observarunt*, &c. I have not an opportunity of ascertaining how far Frisch carried his observations on this subject, but I think it right to name the circumstance.

XXII. *Observations on Arragonite, together with its Analysis. By the Rev. John Holme, A.M. F.L.S.*

Read April 6, 1813.

THERE is no substance, which has of late years more excited the attention of chemists and mineralogists, than Arragonite, so called from the place where it was originally discovered. As the only anomaly in the Abbe Haüy's Theory of Crystallization, it has long been suspected that in its chemical analysis it would be found to differ from the carbonates of lime, with which it has been hitherto classed. This suspicion has been augmented by other circumstances of external character, beside those of crystallization and mechanical division. It is much harder than any of the common crystallized carbonates of lime, so as to scratch them easily. Its specific gravity is also greater, being 2.9465*, instead of 2.718†, which is the specific gravity of common calcareous spar. Yet the most careful analysis of Arragonite has not brought to light any fact at variance with the received opinion concerning its composition. " The difference in its primitive form," it is said, " does not result from any difference in its chemical combination‡."

Under these circumstances I was induced to undertake the analysis of Arragonite. The result, I trust, will prove that it is not, as has been so often asserted, a pure carbonate of lime; and

* Haüy. † Thomson's Chemistry, vol. iv. ed. 4, p. 347.

‡ Brongniart's Mineralogy, vol. i. p. 222.

 that,

that, therefore, it ought not to be considered as constituting any anomaly in the theory of Haüy; which admits a difference of structure, or of mechanical division, whenever there is a change in the constituent parts of a simple mineral.

The difficulty of obtaining good specimens of Arragonite for some time delayed my experiments; but having at last procured some very fine hexahedral crystals of that mineral, I selected the purest parts of these, and proceeded in their analysis.

My observations were the following: A moderate degree of heat, when applied to a small fragment of Arragonite, is sufficient to reduce it to a white, opaque powder. The substance at the same time loses part of its weight. The volatile matter which makes its escape produces no decrepitation, but passes off silently, in a manner similar to that of carbonic acid when expelled by heat from chalk or limestone.

Experiment 1.—In order to ascertain the nature of this volatile matter, I made the following experiment: A small glass bulb furnished with a narrow tube was filled with 205 grains of Arragonite coarsely powdered; but previously both the powder and vessels had been exposed to the heat of the sun, for the purpose of driving off any moisture which might adhere to their surfaces. The bulb was then imbedded in a crucible filled with dry sand, and placed in an open furnace containing a charcoal fire. The tube of the bulb was bent in such a manner, that its extremity could easily be brought under the orifice of an inverted glass tube filled with mercury. The fire surrounding the crucible was gradually raised, care being taken not to expose the *subject* to too high a temperature, for fear of separating the carbonic acid from its base. In the space of about thirty minutes an elastic fluid was collected over the mercury, causing it to descend about an inch and a half. The mercurial trough, &c. were now removed into a

cold

cold situation; and as the inclosed air acquired the temperature of the surrounding medium, the interior of the glass tube, occupied by it, became gradually covered with moisture, which at length ran down in striæ. Now, as the vessels, and the substance contained in the bulb, were carefully freed from superficial moisture, the water could only be derived from the Arragonite used in the experiment. Lime-water was then admitted to the air confined over the mercury, but produced no precipitate. Hence it is evident that carbonic acid gas was not present, at least in any sensible quantity. On a further examination of this elastic fluid, it was found to be merely atmospheric air, which had been expanded out of one vessel into the other during the operation. Thus it appears that Arragonite, when exposed to a degree of heat inferior to that which is requisite to calcine it, gives out water, and, at the time of its expulsion, reduces the calcareous substance to a white, opaque powder, and that without decrepitation*. Hence it is inferred that the water contained in the mineral is chemically combined with its constituents; for, if otherwise, it would exhibit the same phænomenon of decrepitation which attends the extrication of water from calcareous spar, when exposed to the action of heat.

Experiment 2.—When water is present in common calcareous spar, it occupies only certain interstices, from which it may be easily expelled at a low temperature, and even without affecting its general transparency. Arragonite, on the contrary, when deprived of its aqueous particles by a slight degree of heat, loses all its transparency; from which it may be concluded that these

* The analyses of Arragonite and of calcareous Spar, by Thenard and Biot, show that the quantity of water contained in the former exceeds that of the latter.—*Mem. d'Arcueil*, ii. 176.

particles are chemically combined with the constituents of the mineral, being uniformly diffused through the whole mass.

Experiment 3.—One small specimen of calcareous spar, and another of Arragonite, about the same size, were placed at the same instant on a plate of iron heated to redness. The thickness of the plate somewhat exceeded half an inch. The former specimen began almost immediately to decrepitate and disperse, whilst the other remained unaltered; but afterwards acquiring a greater degree of heat, the Arragonite fell gradually to powder. This experiment proves that the water is retained more strongly in the Arragonite than it is in the calcareous spar; from which circumstance the same inference may be made as before, viz. that water is chemically combined in the Arragonite, and only mechanically mixed in the other substance. This operation I have frequently repeated with the same result, and also in a manner more precise as to the degree of heat required for expelling the water from each kind of calcareous spar.

Experiment 4.—I took a part of a crystal of Arragonite, and, fixing it to the end of a wire, plunged it into boiling mercury, and kept it there for some time. Upon withdrawing it, no change had taken place, the spar coming out unbroken, and with its original transparency.

Experiment 5.—I then took a piece of common calcareous spar, which was part of a stalactite, and plunging it in the same manner as before into boiling mercury, it instantly decrepitated and flew to pieces.

Experiment 6.—Gypsum also tried in the same way lost its water of crystallization, which, as it was some time in coming away, gave to the mercury the appearance of violent ebullition from the escape of the water under it in the state of vapour.

Expe-

Experiment 7.—The water that is contained in the Arragonite being chemically combined with the lime and carbonic acid, may occasion a closer union in those parts; and this I have in some measure verified by taking the specific gravity of Arragonite after its desiccation. It proved to be 2.727 instead of 2.94, which was its original specific gravity; and at the same time, by a similar mode, the specific gravity of Iceland crystal was 2.732. This near equality of specific gravity in the two bodies is sufficient to show that Strontian earth does not enter into the composition of Arragonite, as has been lately advanced by a German chemist.

Analysis.

Some transparent crystals of Arragonite were reduced to powder, which was dried in the sun, to be certain of not overheating it.

Twenty grains of this powder were weighed, and wrapped up in a clean thin leaf of platinum, that no part of it might be lost. The weight of the platinum was previously determined. The Arragonite thus folded up was placed on a plate of iron heated red-hot, and, after remaining in that situation for a short time without any of the carbonic acid being expelled, was carefully weighed in an excellent balance, and the inclosed substance was then found to have lost 0.16 grain of volatile matter, which has been already proved to be water. I made several experiments of this kind, but without observing any difference in the results.

The substance inclosed in the leaf of platinum was afterwards kept in the fire till it had acquired a dull red heat. The loss of weight, when accurately ascertained, = 0.25 grain. This additional diminution of weight cannot, I think, be ascribed to a further loss of water, because in this experiment a thin piece of Iceland crystal, which had been wrapped up together with the Arragonite, (but taken out before the deficit in weight was estimated,) and

and of course subjected to the same degree of heat, was superficially calcined. Hence it is concluded that the Arragonite which accompanied it had undergone the same process, and parted also with a portion of its carbonic acid. On this account, it is probable that the weight of water in 20 grains of the substance analysed cannot be far different from that which has been already stated, viz. 0.16 grain.

The 20 grains of Arragonite contained in the leaf of platinum were put into the bowl of a tobacco-pipe, which had a cover fitted to it, and exposed to a strong heat till the calcareous substance was thoroughly calcined. The lime weighed whilst warm 11.16 grains: consequently the weight of the volatile matter driven off = 8.84 grains. But the weight of water in 20 grains of Arragonite = 0.16 grain. The weight, therefore, of the carbonic acid will = 8.68, or per cent.

	Grs.	
Lime - -	= 55.80	= 100 grs.
Carbonic acid -	= 43.40	
Water - -	= 0.80	

It does not seem, therefore, unreasonable to conclude that the water, since it appears to be an essential part of the composition of Arragonite, should produce that variation of specific gravity, hardness, and crystalline form, which distinguishes it from the common crystallized carbonates of lime. For though the quantity of water be not agreeable to the usual proportions in which bodies have been observed generally to unite; yet there are instances where great changes are produced by similarly small additions of a foreign ingredient. A very striking one, among many others which might be noticed, is in the change of iron to steel, which is effected by a quantity of carbon as small in proportion to the iron as that of the water in the Arragonite.

Analyses

Analyses of Arragonite and of calcareous Spar by MM. Thenard and Biot. Mem. d'Arcueil, ii. 176.

	Arragonite.		Calcareous Spar.
Lime -	= 56.351	-	= 56.327
Carbonic Acid	= 42.919	-	= 43.045
Water -	= 0.730	-	= 0.625
	100.000		100.000

Note,—Since the above observations were written, it has been again asserted, that the presence of *Strontian* in *Arragonite* has been ascertained by the German chemist before mentioned in p. 239, not as an adventitious mixture, but as an essential constituent. In answer to which I have only to observe, that in the specimens of Arragonite which I have subjected to analytical examination, I have never detected an atom of *Strontian*. Of course every thing must depend upon the purity of the specimens selected by the German Professor for his experiments.

Cambridge,
November 4, 1814.

XXIII. *Further Observations on the Genus Melöe, with Descriptions of Six Exotic Species.* By *William Elford Leach, M.D. F.L.S.*

Read November 2, 1813.

I TAKE the liberty of laying before the Society descriptions of six exotic species of *Melöe*, together with additional remarks on the British species already described in their Transactions*.

The investigation of a greater number of species has enabled me to ascertain the leading characters of several subdivisions, and to annex the specific characters†.

* Page 35 of this volume.

† From Latreille's invaluable *Genera Insectorum* I have extracted some distinctions (not noticed, or not well defined) which will amend the generic character.

" Antennæ *oculorum margine interno proxime insertæ.*" "*Articulis breviter subobconicis, vel subturbinato-quadratis, rotundatis, et compressis.*"

" Labrum *exsertum, clypeolo affixum, coriaceum.*"

" Mandibulæ *corneæ latere interno inæqualiter multidentato, aut angulato.*"

" Maxillæ *laciniis duabus conniventibus coriaceo-membranaceis, hirsuto-fimbriatis;* externa *subobtrigona, incurva, intus ad apicem subacuminata;* interna *subquadrata.*"

" Elytra *abdomine plerumque breviora, extus inflexa, postice late dehiscentia;* unius *margine interno ad basin*" (*sæpius*) " alterius *eodem margini superposito.*"

" Pedes *oleum per geniculos emittentes;* tibiis posticis *calcare*" (*externo*) "*incrassato apicem*" (*sæpius*) "*oblique truncato, dilatato.*"—Latreille, *Gen. Crust. et Ins.* ii. p. 216, 217.

SYNOPSIS

SYNOPSIS SPECIERUM*.

A. Antennæ in utroque sexu filiformes, breviores, subcrassiores.

* *Antennæ apice integræ.*

1. *Thorace quadrato.*

1. *M. cicatricosus.* Niger obscurus, capite thoraceque punctatis, elytris scabrosis.
2. *M. variegatus.* Sub-æneus, cupreo viridique variegatus, capite thoraceque punctatis, elytris scabrosis.
3. *M. punctatus.* Niger, capite thoraceque profundè impresso-punctatis, elytris varioloso-punctatis.
4. *M. angulatus*†. Niger, capite thoraceque impresso-punctatis, hoc utrinque angulo antico producto, elytris subrugulosis.
5. *M. uralensis.* Nigro-ater, lævis, capite thoraceque subpunctatis, elytris sublævibus.

2. *Thorace utrinque producto.*

6. *M. excavatus.* Niger, lateribus pallidis, capite triangulato lævi punctato, thorace utrinque excavato, elytris excavato-punctatis.

** *Antennæ apice emarginatæ.*

7. *M. maialis.* Ater, glaber, marginibus segmentorum dorsalium fulvis.

* MELÖES, 1. *lævigata*, Oliv., Fabr. 2. *cyanea*, Fabr. 3. *limbata*, Fabr. 4. *punctata*, Panz. (*Brunsvicensis*, Meyer). 5. *Viennensis*, Schrank. 6. *erythrocnema*, Pallas (Ic. Ins. Ross. II. 76. E. 1. Tab. E. fig. 1.), Meyer. 7. *aprilina*, Meyer, Insecta mihi incognita.—MELÖE *marginata*, Fabr., Meyer, (*Galeruca brevipennis*, Illiger, Schonher); forte genus peculiare efformans.

† Antennæ desunt, attamen ad hanc sectionem pertinere videtur.

B. Antennæ in utroque sexu filiformes, longiores, tenuiores.

8. *M. autumnalis.* Niger, capite thoraceque punctatis, elytris punctis erosis confluentibus.

C. Antennæ (maris præsertim ?) extrorsum crassiores.

* *Thorace brevi transverso.*

9. *M. brevicollis.* Niger subviolascens, elytris subrugosis.

** *Thorace elongato.*

10. *M. lævis.* Nigro-ater, lævis, capite thoraceque punctis minutis sparsis, elytris sublævibus.

D. Antennæ (maris præsertim) medio crassiores, sæpius fractæ.

11. *M. Proscarabæus.* Niger, capite thoraceque punctatis, elytris rugosis, lateribus capitis thoracisque pedibus antennisque violascentibus.
12. *M. violaceus.* Violaceus, capite thoraceque punctatis, elytris rugosis.
13. *M. tectus.* Niger, capite thoraceque punctatis, elytris subrugosis elongatis, antennis medio crassissimis.
14. *M. americanus.* Niger, capite thoraceque violascentibus glabris vagè punctatis, elytris nigris subrugulosis.
15. *M. glabratus.* Capite thorace elytrisque glabris subpunctatis.

1. MELÖE CICATRICOSUS.

Melöe cicatricosus. *P.* 39. TAB. VI. *fig.* 5. 6.

2. MELÖE VARIEGATUS.

Melöe variegatus. *P.* 37. TAB. VI. *fig.* 1. 2.
Melöe majalis. *Meyer Tent. Monog. Gen. Mel. p.* 17. *sp.* 3.
Panz. Fn. Ins. Germ. Ind. Ent. par. i. *p.* 208. 2.
Oliv. Enc. Met. vii. 650. 2.

I am

I am informed by Mr. Hunneman, that this species is highly prized in Germany as a medicine, being considered a specific in hydrophobia. For this purpose it is taken by slipping a hair round its neck, and suspending it until it be dry; by which means the oily secretion they throw out when first taken is preserved, in which its chief virtue is supposed to exist*. Meyer, in his excellent Monograph on this genus, mentions its virtues as a diuretic, and in curing hydrophobia: he describes also what he considers a variety, differing in the structure of the antennæ; but, from what he says, I should be inclined to consider it as an accidental formation, or a distinct species. "Exemplaria (ait) inveniuntur, ubi nonnisi septimo articulo antennarum fractura incipit. Hujus varietatis specimen mecum communicavit Car. Persoon, quod hisce in regionibus (i. e. prope Gottingam) cepit. Ceteris suis proprietatibus autem hæcce varietas a specie non differt." *Meyer Monog.* p. 14.

The food, too, according to Meyer, consists of the leaves of *Veratrum album*, *Viola*, *Anemone*, *Ranunculus*, *Anchusa officinalis* and *Cynoglossum officinale*.

3. MELÖE PUNCTATUS.

M. niger, capite thoraceque profundè impresso-punctatis, elytris varioloso-punctatis.

* Since writing the above I have been favoured with a more particular account by Mr. Hunneman.

"The late King of Prussia (Frederick the Great) purchased the nostrum from the discoverer for a valuable consideration, as a specific against the bite of a mad dog; and in 1781 it was inserted in Sect. ii. p. 25, of the *Disp. Boruss. Brand.* According to this publication, twenty-five of these animals that have been preserved in honey, are with two drachms of powdered black ebony, one drachm of Virginia snake-root, one ditto of lead filings, and twenty grains of fungus Sorbi, to be reduced to a very fine substance; the whole, with two ounces of theriaca of Venice (and if necessary, with a little elder-root) to be formed into an electuary."

 Melöe

Melöe punctatus. *P.* 44.

Melöe punctata. *Fabr. Ent. Syst.* ii. 518. 4.

Syst. Eleut. ii. 588. 6.

Melöe Tuccia. *Rossi Fn. Etrus. tom.* i. *p.* 238. *n.* 591. *tab.* 4. *fig.* 5?

Meyer Tent. Monog. Gen. Mel. p. 30?

Habitat in Lusitania, Dom. Sieber.—In Malta, Mus. Dom. MacLeay.—In Italia, Rossi?

Mus. Britannico, Dom. Milne, MacLeay, Leach.

Tab. XVIII. Fig. 1.

DESCR. Caput nigrum punctis distinctis profundis impressis. *Antennæ* nigræ, basi præsertim, pilis brevissimis atris obtectæ.

Thorax niger, punctis sæpè confluentibus profundè impressus, posticè emarginatus et medio sub-marginatus, disco glabro impunctato longitudinaliter impresso.

Elytra nigra, nitida, varioloso-punctata, apice abruptè rotundata, margine interno sub-crenulato.

Abdomen nigro-atrum, obscurum, molle. *Dorsi* articulorum ultimo, et penultimo, cum ventre nigris, nitidis, punctatis.

Pedes nigri, pilis brevissimis conferte obtecti.

The original specimen from which Fabricius described the insect is still preserved in the British Museum. In page 44 of this volume I have most erroneously referred to Panzer for a figure of this insect; but I am now convinced of my mistake, and take this opportunity of apologizing to Panzer for supposing that he could have intended his figure for this species. At the time that paper was written I had no doubt on the subject, as his figure came nearer this insect than any other I was then acquainted with: all the references to Panzer, therefore, must be excluded, and likewise its habitat "in Germaniâ."

I have little doubt that Rossi's *Melöe Tuccia* is intended for this insect, and I find Fabricius entertained a similar opinion: if this idea be correct, the references to Rossi's work, and to that of

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of Meyer, who has merely copied Rossi's description, may remain. Meyer considers it possible that this may be a variety of his *M. Brunsvicensis*, which he considers to be the same with Panzer's *M. punctata*, x. *tab.* 16.

4. MELÖE ANGULATUS.

M. niger, capite thoraceque impresso-punctatis, hoc utrinque angulo antico producto, elytris subrugulosis.

Habitat ad Caput Bonæ Spei.

Mus. Dom. MacLeay.

DESCR. CAPUT profundè impresso-punctatum nigrum, punctis nonnunquam confluentibus. *Vertex* subimpressa.

THORAX (diametro longitudinali transverso subæquante) niger, punctato-impressus punctis sæpiùs (in disco præsertim) confluentibus, anticè latior, utrinque angulatim-productus, medio longitudinaliter impressus.

ELYTRA undulatìm striata, nigra.

ABDOMEN sub-atro-nigrum, molle, singulo segmento maculâ semicirculari rugulosâ. *Venter* sub-coriaceum, rugulosum.

PEDES nigri, pilis sub-nigro-atris brevissimis obtecti. *Ungues* omnes ferrugineo-picei.

The only specimen of this insect I have had an opportunity of examining, occurred in the extensive and valuable collection of my friend Mr. MacLeay, who in this, as on every other occasion, has most liberally permitted me to take away and retain as long as might be necessary any of his insects. The antennæ are mutilated, but from its general habit I have little doubt of its situation in the present section being correct.

5. MEÖE URALENSIS.

M. nigro-ater, lævis, capite thoraceque sub-punctatis, elytris sub-lævibus.

Melöe Uralensis. *Pall. Icon. Ins. Ross.* ii. *p.* 76. *n.* 2. *tab.* E. *f.* 2. *Iter.* ii. 722. 56.

Melöe

Melöe punctata. *Meyer Tent. Monog. Gen. Melöes*, 28. *sp.* 9.
Habitat in collibus circa Upham inque Uralensium et Altäicarum Alpium apricis, teste Pallas.
Mus. Soc. Linn.

TAB. XVIII. Fig. 2.

DESCR. CAPUT punctis minutis adspersum, fronte lineâ longitudinali sub-impressâ. *Antennæ* et *palpi* obscurè sub-ferrugineo-picei.

THORAX transversus punctis minutis adspersus, anticè sub-undulatus, posticè latè emarginatus, et marginatus, lateribus utrinque faveolâ excavatâ, medio longitudinaliter impressus.

PEDES nigri, pilis brevissimis atris obtecti. *Tarsi* sub-picei. *Ungues* ferruginei.
β Pedibus rufescentibus.

Pallas, to whom we are indebted for the discovery of this species, has given a most excellent figure in the work above quoted. Fabricius quotes this as his *M. punctata;* and Meyer, from this false reference, confounds *M. punctata* of Fabricius and this together. But as he has copied the description given by Pallas, this must be considered as his *punctata*, with which he has likewise placed *M. Viennensis* of Schrank, (*Beyträg.* ii. *Naturg.* p. 71. 20,) which has the following specific character, "*M. apterus lævis, ater, unicolor;*" but from the figure I should conclude it to be distinct.

6. MELÖE EXCAVATUS.

M. niger, lateribus pallidis, capite triangulato lævi punctato, thorace utrinque excavato, elytris excavato-punctatis.
Habitat ——— ?
Mus. Dom. Francillon.

TAB. XVIII. Fig. 3.

DESCR. CAPUT triangulatum, punctatum, anticè compressum, lateribus posticè productis. *Antennæ* minimè hirtæ.

THORAX utrinque anticè angulatim-productus, foveâque utrinque excavatus, posticè marginatus, sub-emarginatus.

ELYTRA nitida, nigra, punctis obscuris, nigris, excavatis.

ABDOMEN

ABDOMEN pallidum, molle, *Dorso Ventreque* sub-scabrosis, nigris, coriaceis.

PEDES glabri, nigri. *Ungues* interni tenues, nigricantes; externi nigri apice ferrugineo.

This very curious species, of which I have seen but one specimen, is marked "from Germany;" but as I can find no description of it, I am inclined to suspect this to be an erroneous habitat.

7. MELÖE MAIALIS.

Melöe maialis. *P.* 38. TAB. VI. *fig.* 3, 4.

8. MELÖE AUTUMNALIS.

Melöe autumnalis. *P.* 40. TAB. VI. *fig.* 7, 8.

This species, Mr. Milne observes, is not found in plenty every year; indeed in the last autumn not one occurred.

9. MELÖE BREVICOLLIS.

Melöe brevicollis. *P.* 41. TAB. VI. *fig.* 9.
Meyer Tent. Monog. Gen. Melöes, p. 23. *sp.* 6.
Panz. Fn. Ins. Germ. Ind. Ent. i. 208. 4.

β Pedibus rufis violascentibus.

10. MELÖE LÆVIS.

M. nigro-ater, lævis, capite thoraceque punctis minutis sparsis, elytris sub-lævibus.

Habitat in Insulâ Americes St. Domingo.

Mus. Nostr. ex Mus. Davies.

TAB. XVIII. Fig. 4.

DESCR. CAPUT nigro-atrum, glabrum, punctis minutis sparsum. *Antennæ* nigræ, subpilosæ, nitidæ, articulis tribus ultimis nudis, obscuris.

THORAX nigro-ater punctis minutis nigris, posticè marginatus, lineâ a disco ad marginem posticam ductâ.

ELYTRA lævia, oculo optimè armato reticulato-strigata.

ABDOMEN atro-nigrum, *Dorso* molli macula coriacea rugulosa in singulo segmento, *Ventre* ruguloso.

PEDES nigri, nitidi, pilis atris obtecti. *Ungues* externi picei, interni crocei.

TWO

Two imperfect specimens of this singular insect occurred in General Davies's collection; and at his death fell into the hands of a dealer, from whom I purchased them.

11. Melöe Proscarabæus.

Melöe Proscarabæus. *P.* 46. Tab. VII. *fig.* 6, 7.
Oliv. Enc. Method. vii. *p.* 650. 1.
Melöe atrata. *Meyer Tent. Monog. Gen. Melöes, p.* 15. *sp.* 2.?
Var. γ. Corpore toto cærulescente, antennis pedibusque violascentibus.
Habitat in Malta.
Mus. Dom. MacLeay.

12. Melöe violaceus.

Melöe violaceus. *P.* 45. Tab. VII. *fig.* 3, 4, 5.
Melöe Proscarabæus. *Meyer Tent. Monog. Gen. Melöes, p.* 11. *sp.* 1.?
Var. ζ. Intensè violaceus, elytris majis rugosis.
Habitat in Braziliis.
Mus. Dom. MacLeay.

13. Melöe tectus.

Melöe tectus. *P.* 47. Tab. VII. *fig.* 8, 9.
Melöe tecta. *Meyer Tent. Monog. Gen. Melöes, p.* 19. *sp.* 4.
Melöe punctata. Var. β. *Panz. Fn. Ins. Germ. Ind. Ent.* i. 208. 3.
Var. γ. Sub-testaceus totus, capite coxis femoribus tibiis pleurisque violascentibus.
Mus. Dom. MacLeay.

14. Melöe Americanus.

M. niger, capite thoraceque violascentibus glabris vagè punctatis, elytris nigris sub-rugulosis.
Habitat in Georgiâ.
Mus. Dom. Francillon ♂ et ♀.—MacLeay ♀.

Tab.

TAB. XVIII. Fig. 5, 6.

DESCR. Caput violascens, punctis minutis impressum.

THORAX violascens, punctis minutis vagè impressus, posticè emarginatus, et marginatus.

ELYTRA nigra, subnitentia, minimè rugulosa.

ABDOMEN nigrum, subnitens, rugulosum, coriaceum.

PEDES nigri, pilis brevissimis obtecti. *Ungues,* Interni ferruginei ; externi nigri.

15. MELÖE *Glabratus.*

Melöe Glabratus. *p.* 43. *tab.* v. *fig.* 1, 2.

XXIV. *Of the Developement of the seminal Germ.* *By the Rev. Patrick Keith, F.L.S.*

Read November 16, 1813.

No phænomenon observable in the process of germination has excited so much wonder, and remained at the same time so totally inexplicable, as that of the invincible tendency of the radicle and plumelet to insinuate themselves respectively into the soil and atmosphere, independent and in despite of all accidental obstacles that may happen to be thrown in their way.

If a seed or nut of any sort is placed in the proper soil with the apex of the radicle pointing downwards, the radicle as it elongates will descend in a perpendicular direction and fix itself in the earth; and the plumelet issuing from the opposite extremity of the seed will assume a vertical direction and ascend into the air. This is the natural order of the developement of the seminal germ; and from the relative situation of its respective parts its developement does not seem to be at all surprising. But the circumstance exciting our surprise is, that the radicle and plumelet will still continue to effect their developement invariably in the same manner, whatever may have been the original position in which the seed was deposited in the soil. For, if its position shall happen to have been accidentally inverted, so as that the radicle shall be uppermost and the plumelet undermost, the former will then bend itself down till it gets a hold of the soil, and

and the latter will in like manner bend itself up till it reaches the air. And no human art has ever been able to make them assume contrary directions, or to convert the one into the other, as the root and branches of the vegetating plant may afterwards be sometimes converted.

Du Hamel, whom no phytologist has ever surpassed in the invention of expedients to unmask or to control the operations of the vegetative principle, instituted a variety of experiments with a view to effect this conversion, and failed in them all. He first placed an acorn between two wet sponges suspended from the ceiling of his room, so as that the radicle was uppermost and the plumelet undermost. The result however was, that the radicle, after bursting its integuments, assumed a downward direction, and the plumelet in its turn an upward direction, till each had gained its natural position. He then filled a tube with earth, and planted also an acorn in it in an inverted position. But the radicle and plumelet had no sooner escaped from their envelopes, than they began to assume their natural direction as before. He then filled another tube with earth, of a diameter so small, that an acorn when introduced into it touched the internal surface on all sides. It was planted in its natural position, and allowed to remain so till the radicle appeared. The tube was then inverted, and the radicle began immediately to bend itself downwards. The tube was again inverted, and the radicle resumed its original direction*.

Such is the invincible tendency of the radicle to fix itself in the soil, and of the plumelet to escape into the air. How is this tendency to be accounted for? A great many conjectures have been offered in reply to the inquiry, without having done much to elucidate the subject. Some have attributed the phænomenon

* Physique des Arbres, tome ii. chap. 6.

 to

to the excess of the specific gravity of the juices of the radicle beyond that of the juices of the plumelet, which in their progress upwards were supposed to be reduced by the process of elaboration to a light vapour. But this is by no means known to be the fact; or, rather, it is known not to be the fact, and consequently forms no ground of argument. Others have attributed it to the respective action of the sun and earth; the former attracting the leaves and stem, and the latter attracting the root. But it happens rather unfortunately for the conjecture, that the phænomenon is exactly the same even when seeds are made to vegetate in the dark. Du Hamel repeated the experiment in a dark room, and obtained the same result as in the light. The influence of the sun was then transferred to that of the air, which was thought to have some peculiar attraction for the plumelet that the earth had not. But the attraction of the air was just as mysterious as that of the sun, and the subject as much in want of elucidation as before.

In this stage of the inquiry Dr. Darwin, of philosophical and poetical memory, undertook the explication of the phænomenon, and endeavoured to account for it chiefly upon the principle now specified, the radicle being presumed to be stimulated by moisture, and the cotyledons and plumelet by air, and each to be hence elongated in the direction of its exciting cause*, which is precisely the direction assumed by the radicle and plumelet respectively in the actual developement of the seminal germ; the former descending into the earth, as being excited by the action of moisture, and the latter ascending into the atmosphere, as being excited by the action of the air.

This hypothesis is, no doubt, sufficiently ingenious, but is by no means to be regarded as a satisfactory solution of the difficulty. For at this rate all cotyledons, germinating in their natural soil,

* Phytolog. sect. ix.

ought

ought to rise above ground in obedience to the stimulus of air, which all cotyledons do not; and all seeds ought to germinate, if not in the water, at least in the earth, though many of them will germinate in neither; but on trunks and stumps of trees, as many of the Mosses; or on the bare and flinty rock, as many of the Lichens. And if the radicle is naturally stimulated by moisture, and the cotyledons and plumelet by air, and each elongated in the direction of its exciter; then, if an inverted seed is so placed by art that moisture shall reach it only from above, and air only from below, the radicle ought unquestionably to elongate itself by *ascent*, because that is the direction of its exciter; and the plumelet ought also to elongate itself by *descent*, because that is the direction of *its exciter*. But this did not happen in the case of any of Du Hamel's inversions, in one or other of which the supposed conditions must have been almost literally fulfilled; nor did it happen in the case of the following experiment, which was instituted expressly for the purpose of putting Dr. Darwin's hypothesis to the test.

On the 24th of July 1812 I procured a tube of glass of four inches in length, and nearly an inch in diameter, which I filled with garden mould, and suspended from the ceiling of my study. Into the lower extremity of the tube I then introduced a kidney-bean and a grain of wheat, inserting them in the mould by somewhat more than the one-half, with the apex of the radicle upwards, and the base of the seed touching the inner surface of the tube, that the process of germination might be readily traced through the glass. The earth was then almost wholly above them; and the water with which it was occasionally moistened was applied at the upper extremity, so as to come to the seeds from above, as well as in small quantities at a time, so as just to wet the mould sufficiently, but not to ooze out at the lower extremity.

tremity. Such were the preparations for experiment. What was the result?

On the 25th of July the bean and grain of wheat were swoln with moisture that had reached them from above, and were apparently in a state of incipient germination.

On the 26th of July, at nine o'clock in the morning, the radicle of the bean, which had burst its integuments, was found to have elongated in a straight and horizontal direction to the extent of about nearly a quarter of an inch. At mid-day its elongation was perceptibly advanced, and the apex was just beginning to assume a bend downwards. At nine o'clock in the evening it was found to have elongated in a descending direction to the extent of nearly half an inch, and was so much bent downwards as to exhibit the figure of a sort of hook or sickle, though there was no earth below it, and no moisture coming to it except from above. The radicle of the grain of wheat had not yet burst its integuments.

On the 27th of July, at nine o'clock in the morning, the radicle of the grain was seen projecting beyond its integuments, and as yet ascending at an angle of 45 degrees, or rather forming a sort of faint bend, being only one-twelfth of an inch in length. At nine o'clock in the evening it measured a quarter of an inch in length, and was bent down at the extremity in a perpendicular direction, accumbent on the inner surface of the tube; but the sheath of the plumelet had not yet burst the envelopes of the seed. The radicle of the bean measured nearly three quarters of an inch in length, having descended in a perpendicular direction, and in the open air, below the extremity both of the earth and tube.

On the 28th of July the radicle of the bean had not advanced much in length, but had augmented considerably in thickness.

The

The radicle of the grain measured about half an inch in length, having descended, like that of the bean, till it passed the lower extremity of the tube, though there was no earth in its course, and no moisture coming to it but from above. The sheath of the plumelet had just begun to project beyond the integuments of the seed.

On the 29th of July, at mid-day, the sheath of the plumelet or cotyledon of the grain measured a quarter of an inch in length, having extended in a straight line, sloping a little downwards, with the point ascending, but not more than just perceptibly so. The main fibre of the root measured an inch and a half in length, and the two lateral fibres about an inch each, having assumed now a direction rather horizontal, and along the under surface of the earth of the tube, with the point also ascending. The radicle of the bean had increased much in thickness, and sent out lateral and descending fibres. But the main or tap root had assumed a horizontal direction at the lower extremity, in the manner of the fibres issuing from the grain. At ten o'clock at night the cotyledon of the grain measured nearly half an inch in length, and was evidently bent upwards at the point, forcing its way through the earth, and ascending by the side of the tube, so that its progress was very easily traced.

On the 30th of July the cotyledon of the grain had elongated somewhat in the night, and in the ascending direction it had assumed the day before, being quite half an inch in length. The plumelet of the bean had not yet escaped from within the lobes of the cotyledon, owing, I suppose, to the confined situation in which the seed was placed within the tube, as well as to the want of due nourishment, arising from the circumstance of the root's being now almost wholly below the earth. Indeed the germination both of the bean and grain was much less rapid and vigorous

vigorous than it would otherwise have been at the same season of the year, owing to the tendency by which the radicle and plumelet assumed respectively a descending and ascending direction, thus quitting the sources of nourishment that were placed next to them, in order to reach other sources that were placed at a distance.

On the 31st of July, at nine o'clock in the morning, the cotyledon of the grain was an inch in length, surmounted by the summit of the first real leaf, that projected beyond it by about a quarter of an inch, with an inflected point, and forming, together with the cotyledon, the figure of a hook or sickle. At nine o'clock in the evening, the summit of the first leaf, still inflected at the point, surmounted the sheath by about half an inch. Its elongation was still vertical, and its sickle-like bend lower than even the bottom of the tube, as if forcing itself down into the open air. The bean was also bent down by the stem in the same manner; but the lateral fibres sent out by the radicle were rather ascending into the earth above them. The lobes of the cotyledon were so far separated as to show that the plumelet had ascended vertically within them, and was just about to emerge from between them.

On the 1st of August the shoot of the grain of wheat, which measured an inch and a half in length, and still continued to ascend in a vertical direction through the earth, was in its second leaf; while the plumelet of the bean, which had just begun to protrude its divisions beyond the contour of the cotyledons, was found to have elongated itself wholly in a vertical line.

In the above stage of advancement the experiment was put an end to; it having been already sufficiently proved that Dr. Darwin's hypothesis could not possibly be true, since the radicle was still elongated by descent, even when the earth and moisture

were

were placed above it; and the plumelet, on the contrary, by ascent, even when the access of air was possible only from below. If the points of the roots or fibres became horizontal or even ascending in the latter part of the experiment, it is to be recollected that germination was then past; and that the extremities of vegetating roots are often found to deviate from the line of descent in quest of a more fertile portion of soil.

But although the insufficiency of Dr. Darwin's hypothesis should even be admitted, there remains yet another hypothesis to combat. For Mr. Knight, whose meritorious labours in Phytology are too well known to this Society to stand in need of any encomium from me, has still more recently attempted to account for the descent of the radicle upon the old but revived principle of gravitation, strengthened, as he no doubt thinks, by the following results of experiment.

Beans, which were made to germinate after being fastened in all positions to an upright and revolving wheel, that performed 150 revolutions in a minute, uniformly directed the radicle outwards from the centre, and the plumelet inwards to the centre: and beans that were so fastened to a horizontal and revolving wheel, performing the same number of revolutions in the same space of time, uniformly protruded their radicles obliquely outwards and downwards, and their plumelets obliquely inwards and upwards*; which effects Mr. Knight regards as resulting from the centrifugal influence of the wheel's motion counteracting that of gravitation, which is consequently, in his opinion, and in the natural position of the seed, the cause of the radicle's descent.

This conclusion, if it has not been adopted by botanists in general, has been adopted at least by Sir Humphry Davy, one of the most illustrious chemists and phytologists of the present

* Nichol. Journ. xiv. 410

times, and regarded as affording a rational solution of the curious problem that forms the subject of the present Paper*. To arguments, therefore, conflicting with such high authorities, it may well be supposed that I do not solicit the notice of this learned and enlightened Society but with fear and trembling.

But the grand defect of Mr. Knight's hypothesis is, that it does not at all account for the ascent of the plumelet, unless my recollection of his Paper on this subject is itself defective. And indeed the ascent of the plumelet upon Mr. Knight's principles seems to me to be next to impossible, though it is made to ascend notwithstanding. For if the principle of gravitation is found to act so very powerfully upon the radicle, should it not be found to act also in a similar manner upon the plumelet, and to prevent its ascent altogether? which, if it is not so heavy as the radicle, is at least specifically heavier than atmospheric air, and ought consequently to be subject to the influence of gravitation. We cannot, therefore, regard the power of gravitation as being the cause of the radicle's descent, unless we are at the same time shown how it comes to exert no influence upon the plumelet. Much less are we to regard it in that light, if it can be shown, on the contrary, that there are cases in which the radicle is developed in a direction totally opposite to that of the force of gravitation, that is, by ascent, as may be exemplified in the germination of the seed of the misseltoe.

The seeds of this plant germinate, as is well known, not in the ground, but on branches of the oak or apple-tree; or it may be of some other tree, where they are accidentally left by birds. They will also germinate even when made to adhere to a branch by means of human aid†, which, from their glutinous nature, they may readily be made to do, though I have not myself been

* Lectures on Agric. Chem. p. 30.

† With. Arrang. ii. 203.

able

able to induce germination in this manner, even after many trials. But according to the account of Du Hamel, the seeds of the misseltoe germinate by sending out a small and globular body attached to a pedicle, which, after it acquires a certain length, (about one-fourth of an inch I believe,) bends ultimately towards the bark, into which it insinuates itself by means of a number of small fibres, which it now protrudes, and by which it abstracts from the supporting plant the nourishment necessary to its future developement. When the root has thus fixed itself in the bark, the stem of the parasite begins to ascend, at first simple and tapering, and of a pale green colour, but finally protruding a multiplicity of branches by continually dividing into jointed forks.

If this description is correct, and coming from the pen of Du Hamel I adopt it as the fact, it will be easy to show that the elongation of the radicle of the seed in question must necessarily be by ascent, because it is also a fact that almost all plants of the misseltoe originate in the lower surface of the bough on which they grow. Whatever, therefore, may have been the original direction of the radicle, its ultimate direction must be that of ascent, before it can possibly reach the bark into which it is to fix itself. Now this is a case directly counter to the assumed principle of gravitation, which, till it is satisfactorily accounted for, cannot but be regarded as presenting an insuperable obstacle to the adoption of Mr. Knight's hypothesis.

There is, however, a view of the subject which I have sometimes regarded as giving even to the hypothesis of Mr. Knight a degree of plausibility worthy of some consideration. It appears from the experiments of Du Hamel, which seem to have been repeated by Mr. Knight, that the radicle and plumelet do not augment their mass in the same manner. The former elongates chiefly by the apex, while the latter elongates by means of the intro-

intro-susception of particles deposited throughout the whole of its extent. If, therefore, we regard the additions deposited at the point of the radicle, as being originally almost fluid, which they must indeed be, we shall then find in that fluidity a cause apparently adequate to the effect; the part deposited being thus immediately subject to the law of gravitation, and incapable of supporting itself in a vertical position, even though placed in the soil. And in like manner the mode of augmentation displayed by the plumelet or stem seems calculated rather to facilitate the ascending direction, which it actually assumes from the support that is thus gradually distributed throughout the whole of its extent. And hence a sort of plausibility is given to the hypothesis.

But after all it will not bear the test of a rigid scrutiny; for it will not account for the ascent of the radicle in the case of the misseltoe, because the force of gravitation is here counteracted; nor for the re-assumption of a vertical position by the plumelet that has been inverted, because its mode of growth seems favourable to elongation only in a straight line; nor for the phenomenon of the pendent stem, as in the case of *Cactus flabelliformis* and others; because, upon the very principle assumed, its growth ought to have been upright.

The radicle does not therefore descend by virtue of the law of gravitation, nor of the attraction of moisture: but by virtue of an energy exerted in the direction of gravitation, and guiding it infallibly to nourishment and support; and the plumelet does not ascend by virtue of the principle of levity, or of the attraction of the air, but by virtue of an energy exerted in opposition to that of gravitation, and leading it infallibly to the atmosphere above it; so that even in cases of unnatural and inverted experiment the energy still acts, and the radicle and plumelet elongate according to the law originally imposed upon them, though it be

even

even to the prejudice of their own augmentation, by withdrawing them respectively from the sources of nourishment that are immediately contiguous to them, in order to reach sources that are more distant. But when nature has intended a different mode of developement, as in the case of the seeds of the misseltoe, it has also been able to command it, and to give even to the radicle the power of counteracting the force of gravitation, and of elongating by means of ascent.

What, then, is this controuling and invincible energy that presides over the process of germination, guiding the radicle infallibly to its fit and proper soil, whether in the earth or otherwise, as well as elevating the plumelet till it escapes into the air or other proper medium of developement? Is it not an attribute of the vital principle of the plant itself, impelling it irresistibly, though blindly, to the attainment of an end? The case seems loudly to demand the agency of such a cause, and points out plainly the exertion of an energy that cannot be regarded as being either merely chemical or mechanical.

Perhaps we may be able to elicit some rays of information from a reference to the œconomy of the animal kingdom in cases that are analogous. For if you ask the Zoologist why it is that the foal of an ass, from the moment it is protruded into life, never fails to discover the source from which its nourishment is to be derived, nor the organ proper for laying hold of it: the reply will be, that it is because the Creator has wisely endowed it with a principle of action impelling it to the use of the natural means of self-preservation, and operating infallibly to the attainment of an end, without any thing of intention on the part of the agent.

But if this principle, which has been denominated animal instinct, is admitted in the animal kingdom, why may not a similar principle, to be denominated vegetable instinct, be admitted

in

in the vegetable kingdom? The necessity is in both cases the same; the support and preservation of life, of which the vegetable exhibits indubitable indications as well as the animal, though inferior in degree. And the principle has indeed been claimed, particularly, as I believe, by Dr. Percival of Manchester, though I am not acquainted with the grounds on which he rests his claim, not having hitherto had an opportunity of consulting his Paper on the subject. But on whatever grounds the claim may have been advanced, it cannot by any means be regarded as extravagant or absurd, sanctioned as it is by the analogy of the animal kingdom, and by the necessity of assigning a cause adequate to the production of the effect. For if we must acknowledge that no cause merely chemical or mechanical is sufficient to account for the direction that is invincibly assumed by the radicle and plumelet respectively, in the process of the germination of the seed, we must also of necessity admit the agency of some cause of a higher order, which can be nothing short of an attribute of the vital principle of the plant itself. And the lowest cause we can possibly assign, as well as the only cause we can warrantably assign, is that of an attribute that shall be analogous to the faculty of animal instinct, as being the lowest principle of action influencing a living being; and the only acknowledged cause found to operate in analogous cases; as well as perhaps the only efficient cause by which the apparently spontaneous movements of the plant are in any case directed.

Some of the ancients seem indeed to have claimed for plants principles of action of a much higher order, and to have attributed the desires and passions of animals even to the vegetable race*, thus regarding as a fact, what the author of The Loves of Plants regarded no doubt as a fiction, and elevating the vegetable

* *Αριστ. Περι Φυτων.* Lib. I.

almost

almost to the rank of the animal. But this is evidently an extravagant assumption, which the phenomena of vegetable life will by no means warrant, and which cannot consequently be admitted. Others, more moderate in their assumptions, have been contented with claiming for vegetables the faculty of sensation, alleging that there are phenomena exhibited within the extent of the vegetable kingdom, which it is impossible to account for on any other principle; such as that of the irritability of the sensitive plant, the fecundation of the valisneria, the sleep of the papilionaceæ, and others. But whatever may be the value or fate of this claim, it does not at all affect the merits of the claim now advanced. For, in the first place, it does not necessarily involve the attribute either of animal passion or sensation, any more than it involves the faculty either of seeing or hearing; as being altogether the instinct of a different order of being. In the second place, it is sufficiently elevated above any cause merely chemical or mechanical, to sanction the belief of its adequacy to the production of the effect ascribed to it. And, in the third place, it is claimed only in a case analogous to that in which a similar principle is acknowledged to act in the animal subject. Whence we infer the agency of an instinctive principle in the vegetable subject also, as being the key that opens up the way to the solution of the difficulty in question, and unriddles the mystery of the developement of the seminal Germ, without which it is indeed altogether incomprehensible; but with which it admits of an easy and luminous explication, drawing closer the analogy that subsists between the animal and vegetable kingdoms, and enhancing our notions of the wisdom of the Divine Mind.

Thus, then, it is that the attribute of vegetable instinct, acting agreeably to the original impulse communicated to it by the hand of nature, directs the radicle uniformly downwards, and in con-

currence

currence with the agency of gravitation, when the proper conditions of germination are present, regardless of all obstacles or inducements tending to divert it from its course, as being the natural direction of its proper aliment and support, except in such cases as are exemplified in the germination of the misseltoe; while it directs the plumelet uniformly upwards, and in opposition to the agency of gravitation, when the above proper conditions are present, as being the natural direction of the medium that is the best suited to the developement of its parts.

If it is said that the attribute of vegetable instinct is still but an occult quality of an occult principle, of the abstract nature of which we know nothing, the objections we confess must be admitted; but the case is without remedy, as it is in the animal kingdom also, in which we know nothing of the nature even of the human mind itself, except from its operations.

We do not, however, affect to exalt the living principle of the plant to the dignified rank either of a dryad or a sylph, the notion of whose fabled agency has been represented by Sir Humphry Davy as being equally credible with that of the philosopher who shall assume the agency of "any thing beyond common matter, any thing immaterial in the vegetable œconomy*." And yet the agency of some such principle is so absolutely indispensable, that even while it is thus almost directly denied, it seems to me to be indirectly admitted; unless I have altogether misapprehended the concessions which Sir Humphry makes on this subject. For although he thinks there are few philosophers who would be inclined to assert the agency of any thing beyond common matter in the vegetable œconomy, yet he admits that vegetables may be truly said to be living systems, in as much as they possess the *means* of converting the elements of common matter

* Agricultural Chem. Lect. v.

into

into organized structures*. Now, what are we to understand by the *means* here alluded to, which are evidently an admission of something more than merely common matter? We are not indeed informed in direct terms, but we are warranted in inferring, that the means here alluded to are neither more nor less than *life* itself; which is represented as rendering the analysis of the vegetable subject exceedingly complicated in comparison with that of inorganic bodies, "by its giving a peculiar character to all its productions, the power of attraction and repulsion, combination and decomposition, being subservient to it†." If, therefore, Sir Humphry Davy is not an advocate for the doctrine of materialism, and life merely an attribute of organization, and matter capable of organizing itself, which is absurd, he admits all we contend for, namely, the existence and agency of a living principle, in the common acceptation of the term, on which the functions of the vegetable organs depend, and in which we maintain that a species of instinct may certainly reside, similar in kind to that of animal instinct, but inferior in degree, as being the guide and director of an inferior nature, conspiring to promote the ends of vegetable life, and acting with unconscious but unerring aim.

But still there remains a circumstance unexplained, that is at least closely connected with the present subject, namely, the impossibility of converting the radicle into the plumelet, or the plumelet into the radicle, as the root and branches of the vegetating plant may afterwards be sometimes converted. For if the stem of a young plum- or cherry-tree, but particularly of a willow, is taken in the autumn, and bent so as that one-half of the top may be laid in the earth, one half of the root being at the

* Agricultural Chem. Lect. v. † Elem. of Agricultural Chem. Lect. ii.

 same

same time taken carefully up and gradually exposed to the cold, and the remaining part of the top and root subjected to the same process in the following year, the branches of the top will become roots, and the ramifications of the root will become branches, protruding leaves, flowers, and fruit in due season*.

How then is the anomaly of the successful inversion of the vegetating plant to be accounted for, since no art has yet been able to effect it in the seminal germ? This is a difficulty for which I do not recollect to have seen any solution offered; and in the want of all other plausible conjecture I submit the following: The embryo of the seed is an individual and solitary germ, whose developement is necessarily effected in a determinate manner, owing to the peculiar structure and organization of its parts, and peculiar action of the instinctive principle; that is, by the descent of the radicle into the earth, and ascent of the plumelet into the air, or into the soil and medium respectively suited to each. It could not, therefore, succeed by being inverted, because the radicle and plumelet contain as yet no principle whose developement could be effected in any other way; so that you might just as well expect a child to walk upon its hands, as a seed to germinate by the descent of the plumelet.

But the case is not the same with the vegetating and inverted plant. Its roots and branches contain now multitudes of buds or germs which have been acquired in the process of vegetation, and which, according to the doctrine of Du Hamel, I shall suppose to be plants in miniature, containing the rudiments of every thing necessary to the perfection of the species. Consequently they contain a part equivalent to the radicle of the embryo, and capable of being converted into a root, when placed in a proper

* Physique des Arbres.

soil, as well as a part equivalent to the plumelet, and capable also of being converted into a branch when placed in a proper medium. But the earth affords the proper soil to the one, and the air the proper medium to the other, the powers of vegetation are again exerted, and the inverted plant grows.

If it is said that the existence of the germs in question is merely a gratuitous assumption without proof, I shall only beg to add, that I do not positively insist upon the reality of their existence; but contend that if they should prove to be a non-entity, still the power of inverted vegetation must be admitted to be a power acquired in the process of the plant's growth, dependent upon the principle of propagation by slips and layers, and consequently not possessed by the seminal germ; in the same manner that the power of producing its kind is not possessed by the animal at the time of its birth, but acquired at an after period.

October 12, 1813.

 XXV. *Re-*

XXV. *Remarks on Dr. Roxburgh's Description of the Monandrous Plants of India; in a Letter to the President. By William Roscoe, Esq. F.L.S.*

Read February 1, 1814.

Dear Sir,

I have just received the eleventh volume of the Asiatic Researches, containing Dr. Roxburgh's *Description of the Monandrous Plants of India*, which I have perused with great interest. It was, indeed, reasonably to be expected that the observations of so experienced a Botanist, founded on an actual inspection of the living plants, in their native climate, must be highly valuable; and in this, his readers will not be disappointed. Independent of the additional light thrown upon subjects that have already been inquired into, and which has cleared up difficulties that could not otherwise have been removed, we find many new and splendid plants, now first introduced to our notice, accompanied by such descriptions and illustrations as induce us to hope that, by a further perseverance, this portion of the vegetable kingdom, which was left in the greatest disorder by both Linnæus and Jussieu, will at length be thoroughly understood.

Dr. Roxburgh is, however, still of opinion, that the interior divisions of the corolla in scitamineous plants, may be advantageously employed in ascertaining the essential character; and he has accordingly resorted to them for his leading distinctions of the genera, not indeed without occasionally employing those derived from

from the more immediate parts of fructification. That distinctions founded on the corolla may occasionally be of use, even in determining the genus, I shall not deny; but that any distinctions which can be derived from a corolla, which is strictly speaking monopetalous, can be so described as to characterize the many genera of which this order is composed, I greatly doubt; and the ineffectual attempts that have been heretofore made for that purpose may be allowed to justify such distrust. On the other hand, the distinctions founded on the anthera and its filament, are not only characteristic and permanent, but are sufficiently various and distinct to extend throughout the whole order, and to assign to each genus its proper situation. That these distinctions are confirmed by many others, as well from the sections and form of the corolla, as from the general growth and habit of the plant, is certain; but as these peculiarities have not been found sufficient to lay the foundation of an intelligible and entire arrangement, they must always be considered in a subordinate light; in which, however, they may occasionally be found of considerable use.

With these preliminary remarks, I shall now proceed briefly to point out such parts of Dr. Roxburgh's valuable Paper as seem to me to require observation; being well convinced that, from the interest you take in this subject, any apology for the trouble I may give you will be unnecessary.

Of *Canna*, it appears the garden at Calcutta possesses but one species, the *Indica*, of which, we are informed, the red and yellow varieties are common in every garden in India. I shall, however, take this opportunity of contributing, as far as in my power, towards the elucidation of this genus, which, as you have observed in *Exotic Botany*, (page 83,) wants a thorough investigation. The species may be divided into two sections; 1. C. with the

the segments of the corolla, linear-lanceolate, erect; these have uniformly red, or variegated red and yellow flowers; and 2. C. with the segments of the corolla broad and ovate; with pale-yellow or sulphur-coloured flowers. In the former may be enumerated the *Indica, coccinea*, and *lutea* of the *Hortus Kewensis;* specimens of the two latter of which were sent by Lord Seaforth, when he was Governor of Barbadoes, to the Botanic Garden at Liverpool, where they continue to flower abundantly. In the same section must also be included the *patens* of the *Hort. Kewensis;* which differs from the rest of this section not only in the greater magnitude of the corolla, but in the lip of the nectary; which in the *Indica, &c.* is entire, spatulate, revolute; but in the *patens* is irregular and emarginate, resembling a section of the corolla. This plant has flowered in the Botanic Garden at Liverpool, and is undoubtedly the same as that grown at Sion House, under the name of *latifolia.* The second section contains the *glauca* and *flaccida*, the former of which you have figured in *Exot. Bot., tab.* 102; and which, as you justly observe, is a most distinct species from the *cannacorus* of the *Hort. Eltham. tab.* 59, which is certainly the *flaccida.* There will still remain the *paniculata* and *iridiflora* of the *Fl. Peruviana*, and the *juncea* of *Retz*, which I have not at present an opportunity of ascertaining.

Omitting *Maranta* and *Thalia*, Dr. Roxburgh next proceeds to *Phrynium*, of which his full description (with his excellent figure of *P. capitatum*) has enabled us to form a decisive opinion. That this plant is the same as that of Van Rheede (*Hort. Mal.* xi. *tab.* 34) cannot admit of a doubt; and thus a figure, which has been a sort of common reference for whatever could not be found elsewhere; the *Pontederia ovata* of Linnæus, the *Myrosma cannæfolia* of Gmelin, the *Phyllodes placentaria* of Loureiro, has at length found its proper appellation. To this genus Dr. Roxburgh has added

added two other species, *dichotomum* and *virgatum;* but I am inclined to believe that both these plants, if not already known to us, will be found on investigation to belong to other genera. Dr. Roxburgh, indeed, admits that the habits of his three species of *Phrynium* are different, although he conceives they agree in their generic character; but I have commonly found the true generic distinctions confirmed by the habit of the plant, and am doubtful when this is not the case.

That the three genera of *Maranta*, *Thalia*, and *Phrynium* are nearly allied to each other, is I think evident, as appears more particularly by the seed, in which the albumen of the nuciform fruit is pierced by the thread-like embryo; yet their generic distinctions, as well as their habits, seem to require their separation. In *Maranta* the anthera is irregularly placed on the margin of the petal or petal-like filament: sometimes on the right, and at others on the left; but the edge, where the anthera is found, is always thickened downwards, as if by a concealed stamen; and in some instances this stamen is even separated from the petal, for a very short distance, immediately below the anthera. In *Thalia* the anthera is placed in the middle of its proper filament, opposite to which is the short style, terminating in an irregular ringent stigma, resembling the mouth of a beaker, and wholly different from that of any other genus in the whole order. In *Phrynium*, the anthera is placed in front of a strong arched or inflexed filament, in such a manner, that if it were erect, the anthera would appear to be attached to the back, whilst the stigma is simply funnel-shaped, in which it agrees with the chief part of the scitaminean tribe. These distinctions, in themselves so important, are confirmed by the respective habits of the plants; that of *Maranta* being ramose, and frequently dichotomous; *Thalia* flowering terminally on a long stem from the

centre

centre of the leaves; and *Phrynium* having no stem whatever, its inflorescence bursting from the petiole of the floral leaf.

With Retzius and Jussieu, Dr. Roxburgh was long induced to consider *Hedychium* as a species of *Kæmpferia*, but is now led to believe it a distinct genus; for which he has given additional reasons to those which I had before adduced. Of this beautiful genus only one species is known*, which has long been in this country, and of which there is a good figure in your *Exotic Botany, tab.* 107.

To the three species of *Kæmpferia* already described, Dr. Roxburgh has added another, *K. pandurata;* for which, he observes, he could almost wish to quote the *Manja-Kua* of Rheede, *Hort. Mal.* xi. *tab.* 10. referred to by Linnæus, as *Curcuma rotunda.* That Dr. Roxburgh might have cited this figure for the *pandurata,* I have not the least doubt. The only distinctions that appear to subsist between that and the figure which he has given, are in the form of the leaf, and of the upper lip of the nectary; and these differences it will not be difficult to reconcile. In fact, it clearly appears, from comparing Dr. Roxburgh's figure with that in the *Hort. Mal.* that the *K. Ovata,* in p. 22 of my arrangement, is the *pandurata* of Dr. Roxburgh. My description was taken from the figure of Van Rheede, where the nectary appears to be pointed; but at the time that work was published, minute botanical distinctions were not sufficiently attended to; and the lip, though ovate, might, if viewed aside, take that appearance. On comparing the leaves as given in the two figures, I find them nearly to agree; and the plants are so similar in their general habit, that I have not the least hesitation in withdrawing the specific appellation of *Ovata,* for the more appropriate one of

* Four more are described by Sir J. E. Smith in Rees's Cyclopædia, the *ellipticum, spicatum, thyrsiforme* and *coccineum,* all found by Dr. Buchanan in Nepaul.

pandurata,

pandurata. At the same time I have great pleasure in finding that the plant figured by Van Rheede, which had been classed as a *Curcuma*, but which I conjectured to be a *Kæmpferia*, is found, on such indisputable authority, to belong to that genus.

If the foregoing remarks be well founded, few if any additions are in fact made by Dr. Roxburgh to the species of any of the preceding genera; but this is amply compensated in the genus *Curcuma*, which, as he remarks, are the most easily distinguished of all the scitaminean tribe, and of whose habit, growth, and inflorescence he has given a very full and satisfactory account. Of this genus Dr. Roxburgh describes fourteen species; eleven of which appear to be now first ascertained. In his arrangement of them some difficulties, however, present themselves. For his first sp. *C. zedoaria*, he refers to Willdenow, *vol.* i. *p.* 7, *Amomum zedoaria*, on a reference to which we find the *Hort. Mal.* xi. 7. cited for a figure of the plant, which Willdenow has characterized by the epithet *bona;* and as there is no other figure or author referred to by Dr. Roxburgh, we may presume the plant to be ascertained beyond a doubt. But on proceeding to his next species, *C. zerumbet*, we find the same plate of the *Hort. Mal.* xi. *tab.* 7, referred to by Dr. R. as a figure of this plant also; a circumstance which leaves us still in doubt as to which of the two plants is there represented. For a further explanation as to his *Zerumbet*, Dr. Roxburgh has referred us to the figure in Rumphius *Hort. Amboyn.* v. *tab.*68.; but this, again, is the very figure to which Willdenow has referred (with a query) for his *Zedoaria.* In order to clear up this difficulty, we must have recourse to other authorities, and fortunately these will furnish us with sufficient materials for that purpose. Mr. Salisbury, in his *Paradisus Londinensis*, has described four species of *Curcuma* cultivated in this country; viz. 1. *Longa*, figured in the *Hort. Vindob.* of Jacquin. 2. The true *Zedoary*, accurately

rately distinguished by Father Kamel, the leaves of which are smooth, with a large purple cloud on their upper surface. 3. A plant with smooth leaves, the petioles of which only are purple: and 4. The plant figured in the *Paradisus*, with leaves entirely green, pubescent underneath. Now the most striking distinction noticed by Dr. Roxburgh in the habit of his two species is, that in *Zedoaria* the leaves are sericeous underneath, and the whole plant is green; whilst, in his *Zerumbet*, there is constantly a ferrugineous mark down the centre of the leaves. Hence it clearly follows, that the *Zerumbet* of Roxburgh is the *Zedoaria*, or No. 2 of Salisbury; and that the *Zedoaria* of Roxburgh is the 4th of Salisbury, figured in the *Paradisus* under the name of *Aromatica;* both of them being entirely green, and the leaves sericeous or pubescent beneath. Both these plants are in the Botanic Garden at Liverpool, and agree perfectly with the descriptions given of them.

From this statement I presume to think that the specific appellation of *Zedoaria* should have remained with the plant to which it has always been attached; viz. that with the marked or clouded leaf, and which Dr. Roxburgh himself expressly states is the plant which produces the *Zedoary* of the shops in England; whilst the specific name of *Zerumbet*, as applied to a species of *Curcuma*, should be abolished, and that of *Aromatica*, already given by Salisbury, retained in its stead. This seems the more necessary, as the *Amomum Zerumbet* of Linn. and Willd. is not a *Curcuma*, but a *Zingiber*. The *Curcuma Zedoaria* figured in the *Bot. Mag., No.* 1546, the leaf of which appears to be accidentally variegated with white spots, is probably also the true *Zedoary*, and a different plant from that figured in the *Paradisus*. The synonym, however, in the *Bot. Mag.* should have been to the *Zerumbet* of Roxburgh, and not to the *Zedoaria*.

Of

Of *Amomum* there appear to be in the garden at Calcutta only four species; two of which, the *Cardamomum* and *Angustifolium*, are already distinctly known. The *Aculeatum* and *Maximum* of Roxburgh appear, from their echinated capsules, to resemble the *Globba crispa, viridis,* and *rubra* of Rumph. *Amb.* vi. 60, 61; but Dr. Roxburgh conceives them to be different plants.

Of the genus *Zingiber* Dr. Roxburgh has given nine species, only four of which have before been described. Of the remainder, there are two, the *capitatum* and *marginatum*, which are said to flower from a terminal spike; a mode of inflorescence so entirely different from that of the rest of the genus, which is an imbricated radical scape, as to induce a doubt whether they may not be found, on further investigation, to belong to some other genus.

Amongst the additions made by Dr. Roxburgh to *Zingiber*, I have not included the *Z. Cassumunar*, although he has affixed to it the letter R. in the same manner as to the other newly described plants; this being already known in Europe, and described in my Paper on Scitamineæ in the *Linn. Trans.* under the name of *Z. purpureum.* It flowered in the Liverpool Botanic Garden in the year 1810; and the drawing then made of it perfectly agrees with the excellent figure given by Dr. Roxburgh. At that time I was not aware that this plant was the *Cassumunar* of the shops, which has now been ascertained by Sir Joseph Banks and Dr. Coombe. The specific name of *purpureum* should therefore be withdrawn, and the more determinate one of *Cassumunar* retained. The figure given in Andrews's *Bot. Repository, pl.* 555, under the name of *Z. Cliffordia*, is the same plant, which has also been since figured in the *Bot. Mag. No.* 1426, under its proper name, on the authority of Dr. Roxburgh.

Of *Costus*, Dr. Roxburgh has described only one species, the *Speciosus*; and even this is not so clearly defined as to be free

 from

from doubt. He has indeed referred to your authority (*Trans. Linn. Soc.* i. 249,) and has quoted the figure in Rheede, *Hort. Mal.* xi. 8.; but on referring to your Paper, I find this figure cited by you with a query; and subsequent discoveries have shown that your doubt was well founded. Why was not the reference made to the *C. Arabicus* of Jacquin, (*Pl. Rar. tab.* i.) "whose magnificent figures and full description," as you justly observe, "render all further observations unnecessary?" The figure of Van Rheede is very different, and is probably the true *Costus Arabicus;* it appearing, on the authority of Sir Joseph Banks, communicated to Dr. Roxburgh, that the root of the *Speciosus* does not at all resemble the *Costus Arabicus* of the shops.

Of eight species of *Alpinia* described by Dr. Roxburgh, six are already known, both by descriptions and figures. Of the other two, we are informed that *A. mutica* is an elegant species, and holds a middle rank between *nutans* and *calcarata*, and that *spicata* is the smallest of the species that Dr. Roxburgh had seen.

Among the above six plants already known, is the *Amomum repens* of Sonnerat, figured in *Hort. Mal.* xi. *tab.* 4 *and* 5; which Dr. Roxburgh has now included in *Alpinia*, under the name of *A. cardamomum.* For this arrangement, I am far from presuming that plausible reasons may not be given, although Dr. Roxburgh has not stated them. The fact is, that this plant has been attended with greater difficulty in deciding on its genus than any other in the whole order. In my Paper on *Scitamineæ*, in the *Linn. Trans.*, where this plant is given on the authority of Sonnerat and Willdenow, under the name of *Amomum repens*, I have recorded in a note the opinion with which you favoured me, that "this plant, which affords the common lesser *Cardamum* of the shops, is really an *Alpinia*." It must, however, be allowed, that between this and the other plants included in that genus, there

exist

exist some striking diversities; and that in particular, as Dr. Roxburgh observes, "all the *Alpiniæ* (except this) terminate in a copious raceme or panicle of large gaudy flowers;" whereas this flowers in a procumbent panicle, immediately from the root or base of the stem. Thus, whilst its parts of fructification in some respects resemble an *Alpinia*, its habit connects it more nearly with *Amomum*. On this account I am induced to agree with Dr. Maton, in his observations in the *Linn. Trans. vol.* x. *p.* 249, in establishing this as a new genus, under the name of *Elettaria*. The very full description and explicit figures given of it by Mr. White, Surgeon of the Bombay Establishment*, will now sufficiently enable us to discriminate this from every other genus in the order. If, however, the generic distinction be well founded, it must exist not only in the habit of the plant, but in its inflorescence and parts of fructification, and especially in its anther-bearing filament, which, as you have justly observed, (*Exot. Bot.* ii. 86,) "is the only principle upon which natural genera in this order can be founded." I have accordingly attentively considered Mr. White's figures and description; and after comparing them with those of Van Rheede, and with the essential characteristics of the other genera in the order, find a most striking peculiarity in the conformation of the filament, which rises from the germen, and is connate with the petals and style, but extends in a cylindrical form beyond the diverging of the petals, till it expands into two horizontal appendages or hornlets; after which the filament is continued only by a short erect linear process, forming a sort of proper stamen, and bearing on its edges, at the upper extremity, the double anthera. The lobes of this anthera, as is usual in the true *Scitamineæ*, embrace the style, which is inclosed and conveyed by the cylindrical tube till it rises within a

* Trans. Linn. Soc. vol. x. p. 248.

very

very short distance from the anthera: *vol.* x. *tab.* 5. *fig.* 4, 5, 6. These characteristics seem to me to separate the *Elettaria* from every other genus; the hornlets not being attached to the base of the larger petal or nectarium, as in *Alpinia*, where they seem to perform the office of honey-cups, but being, as in *Amomum*, a simple process of the filament, of no perceptible use in the œconomy of the plant, and contributing merely an additional feature to its discrimination.

To the fine genus of *Alpinia*, it is not improbable that considerable additions may yet be made. In a splendid collection of Chinese drawings, belonging to the Right Hon. Lord Stanley, F.L.S. I find figures of three species, which appear to me to be undescribed, although they equal in beauty any of those hitherto known. The drawings, as usual in Eastern figures, are not accompanied by dissections of the plants; but such an account of them as can be given will not, I flatter myself, be uninteresting to you.

Of the first of these, the inflorescence is terminal and pendulous; the calyx or exterior petal short and pointed; the interior or nectarium, broad, simple, emarginate; its colour bright yellow, regularly streaked with crimson; filament simple, the stigma just appearing beyond the termination; leaves lanceolate, regularly nerved, margins simple, and like some others of the species, the unfolded blossoms have the appearance of fine China-ware, (*Alpinia pennicellata.*)

The second of these varies greatly from any of the order hitherto known, and may perhaps constitute a new genus. The inflorescence is terminal, inclining, but not pendulous; the calyx or exterior petals ovate; nectarium flat, broad, panduriform, colour bright yellow, with a mid-rib or nerve through the middle, from which diverge crimson streaks; leaves lanceolate, glaucous below,

the

the margin strongly nerved. But the part by which this plant is peculiarly distinguished is the filament, which is deeply cloven to the base, so as to form two distinct processes, each of them crowned with its proper anthera, between which rises the style, perfectly free, and not inclosed by a double anthera, as in the rest of the perfect *Scitamineæ.* In other respects this plant appears to be so truly an *Alpinia,* that I am inclined to retain it in the genus under an appellation characteristic of its divided filament (*Alpinia diffissa.*)

In the third of these figures, the calyx is concave, ovate; nectarium broad, flat, nearly circular, but deeply indented on each side of the lip, so as to form three nearly equal sections; colour yellow, with purple rays diverging from its base, where it is spurred; filament simple, terminating in an ovate summit. Stem jointed, inclined to spiral, leaves downy, petioles of the upper ones uniting with the bractes. The habit of the plant is rather that of a *Costus* than an *Alpinia;* but the inflorescence is a loose panicle, and not a bracteated spike, and the whole construction of the corolla seems decisive of the genus. (*Alpinia bracteata.*)

Perhaps no genus in the whole vegetable system has been involved in greater confusion than *Globba.* It is to you, as Dr. Roxburgh has already observed, that we are indebted for the correction of those errors, by which the genus is now as clearly defined, as any of the scitaminean plants. Of this, it appears, there are in the garden at Calcutta six species. 1. The *Marantina,* figured in your *Exot. Bot. tab.* 103. 2. *Bulbifera,* a new species, unless it be the *Sessiliflora,* figured in the *Bot. Mag. No.* 1428, which Dr. Sims thinks probable. Of the 3d, *Orixiensis,* Dr. Roxburgh has given a good coloured figure. For his 4th, *G. Hura,* he has cited the *Hura Siamensium* of Retz, (*Obs. Fas.* iii. *p.* 49,) which Willdenow conjectured to be an *Alpinia,* but which you have ascertained and described from a sketch in the possession of

Sir

Sir Joseph Banks. The 5th, *Globba pendula*, is certainly a new species in this country. The 6th, *Radicalis*, appears to have been sent to this country by Dr. Roxburgh, where it has flowered with Sir Abraham Hume at Wormleybury, and has been figured in *Bot. Mag.*, *No.* 1320, under the name of *Mantissa Saltatoria*; and by Andrews, *Bot. Rep.* 615, under that of *Globba purpurea*. If to these six species we add the *Globba racemosa*, figured in *Exot. Bot. tab.* 117, we shall, I presume, have all the species yet known of this very singular genus.

One of the plants before mentioned, the *Globba radicalis*, differs from the rest of the genus in the manner of its inflorescence, which is radical, and not terminal; a circumstance which has induced Dr. Sims to consider it as a distinct genus. This diversity, however, is found to be supported by others not less decisive, and which he has also noticed, arising as well from the laciniæ of the corolla, as from the large petal-like bractes placed at each division of the scape; but the part which appears to me to be the most conclusive, is found in the two long filiform appendages at the base (or, according to Andrews, the middle) of the filament, which are not met with as far as my inquiries extend in any true species of *Globba*, and which, upon the principles laid down in my former arrangement, must be allowed to be sufficient to characterize this as a distinct genus.

I have thus, perhaps at too great length, endeavoured to lay before you, not only the observations suggested to me by the perusal of Dr. Roxburgh's valuable Paper, but also such remarks as have occurred to me on the subject since my former communication to the Society.

I am, &c.

Allerton,
6th Jan. 1814.

W. R.

XXVI. *Ob-*

XXVI. *Observations on the Genus Teesdalia; in a Letter to Robert Brown, Esq. F.R.S. Libr. L. Soc. By Sir James Edward Smith, M.D. F.R.S. P.L.S.*

Read March 15, 1814.

DEAR SIR,

I OBSERVE with pleasure in the new edition of Mr. Aiton's *Hortus Kewensis*, which you have so greatly enriched, that you have dedicated a genus to the memory of the late Mr. Robert Teesdale, F.L.S., whose merits are well known to the Linnean Society. I became acquainted with this worthy man at Matlock in 1788. Two botanists could not long be in that delightful spot without finding each other out; and our friendship continued, without interruption, till Mr. Teesdale's death, December 25, 1804. He was an accurate and experienced observer, liberal in communicating that knowledge, which it was the happiness of his life to possess.

Your TEESDALIA interests me also on another account. The *Iberis nudicaulis* of Linnæus, on which it is founded, one of our Norfolk rarities, has always appeared to me very different in habit from the rest of the genus, to which botanists have referred it. Nevertheless, the over-ruling character of the irregular corolla seemed of such authority, that it has hitherto been allowed, not only to confine this plant to a genus, with which it has scarcely any thing else in common; but to separate it from another plant, to which it is most intimately allied. I allude to the *Lepidium*

nudicaule of Linnæus, which you have not mentioned, but on whose botanical history I beg leave to offer a few remarks.

This little herb was first announced by the accurate Magnol, in his *Botanicum Monspeliense, p.* 187, by the name of *Nasturtium minimum vernum, foliis tantùm circa radicem.* It is said to grow at the entrance of the celebrated *bois de Gramont,* flowering in the early spring. The short description of this author, which contains nothing to my present purpose, is accompanied by an engraving, rude indeed, but so exquisitely characteristic that it may put to the blush many a laboured and expensive plate.

Sauvages, in his *Methodus Foliorum,* 228 and 281, mentions this plant as a *Lepidium,* expressly saying, in the page last quoted, that the petals are equal.

Linnæus cites both these authors, and no others, in *Sp. Pl., ed.* i. 643, where he has the plant in question as

Lepidium *nudicaule, scapo nudo simplicissimo, floribus tetrandris.*

His short description subjoined is accurate and appropriate. "*Folia radicalia multa, linearia, apice pinnatifida vel dentata. Siliculæ emarginatæ. Petala æqualia. Stamina* 4." Such descriptions in his works, where no authority is cited, are always made from his own observation, and I have no doubt but this was so. Authentic specimens from Montpellier, with the name, as well as the number, three, in pencil and in ink, referring to the *Sp. Pl.,* leave no doubt of the plant intended. I have also received others from the same country, which, till I was led to investigate the subject, I confess were referred to *Iberis nudicaulis,* so precisely do these two plants resemble each other. Mr. Curtis has fallen into the same error, in citing Magnol's synonym for *Iberis nudicaulis,* in his *Fl. Londinensis;* nor does he seem to have perceived that it was already quoted by Linnæus for *Lepidium nudicaule.*

Gerard, in his *Fl. Galloprovincialis,* 347, has the plant of Magnol, by

by the name of *Nasturtium foliis pinnatifidis, caule nudo, floribus tetrandris.* Under this he refers to the *Lepidium nudicaule* and *Iberis nudicaulis* of Linnæus, as if they were the very same thing, without any remark or explanation, or even the slightest distinction of either as a variety.

In *Sp. Pl. ed.* ii. 898, Linnæus repeats all he had before said of this *Lepidium*, subjoining a reference to Lœfling's *Iter Hispanicum*, 155, and the addition of Spain after Montpellier, as the native countries of the plant. He has added, in manuscript, "*foliis pinnatifidis*" to the specific character, and a note of inquiry, "whether Gerard meant to consider this *Lepidium* as the same with *Iberis nudicaulis?*" The latter stands in its proper place, p. 907, with its own synonyms, to which *Flo. Danica, t.* 323, is added in manuscript; but there is no hint of any resemblance or affinity to the *Lepidium nudicaule.* In his *Iter Oelandicum*, 139, occurs a very full Latin description of this *Iberis*, with the precise and important information that "the two outer petals are twice or thrice as large as the others, and the stamens are six." In both editions of *Systema Vegetabilium* Linnæus has inserted a note, expressly declaring the *Lepidium nudicaule* to be distinct from the *Iberis nudicaulis;* so that nothing can be more certain than his uniform opinion on the subject.

Lœfling's description, in the place above mentioned, cannot be exceeded for fullness and accuracy. After detailing the characters of the other parts, he adds,

"*Petala quatuor, cruciformia, æqualia, patentia. Ungues lineares, sensim aucti in laminam obtusam, calyce longiorem. Filamenta quatuor* (*desunt ambo minora*), *ad latus planum germinis, erecta, ad basin a parte interiore aucta glandulâ compressâ, latâ, depressiusculâ, albâ,*" *&c. &c.*

I have examined, by means of boiling water, a specimen from the South of France, and find it answer in every particular to this description.

description. In vain, however, have I sought for any character, or for the slightest difference in the appearance of any other part of the plants, between the *Lepidium* and *Iberis* in question. The latter seems confined to the more northern parts of Europe, the former to the south. Both grow in dry gravelly situations, flowering in the spring. The *Iberis* is never found to vary with us, in the proportion of its petals, or number of its stamens, each of which last has its own scale-like appendage, which could not escape the accuracy of Mr. Sowerby, in making his drawing for *English Botany*, the only work, I believe, in which these appendages, in the *Iberis*, have been mentioned, till you happily fixed on them as a part of the character of your *Teesdalia*. They are indeed shown in Mr. Curtis's plate, *Fl. Lond. fasc.* vi. *t.* 42, but totally neglected in the description.

The *Lepidium* in question seems to be unknown in our gardens. It is much to be wished that we might have an opportunity of cultivating and examining so curious a plant. We might then be able to determine whether its characters were constant. In the mean while I think we must presume it to be a distinct species from the *Iberis*, though I am satisfied, beyond all doubt, that they must belong to one genus. I therefore concur with you in leaving the irregularity of the petals out of the generic character, which may, in that case, be thus expressed.

TEESDALIA.

Silicula emarginata, obcordata, loculis dispermis.
Filamenta basi intùs squamigera.

The species will be:

1. *T. nudicaulis*, petalis inæqualibus.
   Iberis nudicaulis. *Linn.*
2. *T. regularis*, petalis æqualibus, floribus tetrandris.
   Lepidium nudicaule. *Linn.*

Although

Although the specific name *nudicaulis* is applicable to both, I would retain it for our English species; not only to avoid needless changes, and to preserve an association familiar to most botanists, but especially on account of the uncertainty (which I cannot presume I have quite dissipated) whether there be really more than one species. The figure in the *Flora Danica* rather favours this uncertainty. Though that figure can, surely, only represent the *Iberis nudicaulis*, the petals are made nearly equal, and the stamens in one, or perhaps two, flowers, are shown to be only four. In another they seem to be six. The petals are too sharp, as well as too small, for our *Teesdalia nudicaulis*, but the petals of my *T. regularis* are likewise obtuse. The scales, or appendages, are erroneously placed on the external side of each filament, or rather on four of them only. In our English *Teesdalia* they certainly stand on the inner side, just above the base, of every one of the six filaments, though smaller on the two opposite ones than on the rest. The faithful Lœfling describes them as so situated on the four stamens of what I call *Teesdalia regularis*.

I beg the favour of you to lay this communication before the Linnean Society;

And remain,

With great regard, &c.

J. E. Smith.

Norwich,
March 12, 1814.

XXVII. *Some*

XXVII. *Some Observations on the Bill of the Toucan; in a Letter to the Right Hon. Sir Joseph Banks, Bart. K.B. P.R.S. H.M.L.S. By Thomas Stewart Traill, M.D.*

Read March 15, 1814.

SIR,

YOUR polite attention to me on former occasions emboldens me to trouble you with the following observations on the bill of the Toucan.

All systematic authors have described the bill of the genus Ramphastos as *hollow*. The Linnæan character even begins, "*Rostrum maximum inane,*" *&c.*; and Buffon has eloquently enlarged on the supposed error, or oversight of Nature, in furnishing so small a bird with a bill so monstrous and useless. My friend Charles Waterton, Esq., who has lately returned from the interior of Guyana, had observed, that when a portion of the bill of a Toucan is shot away, the remainder bleeds profusely; and on immersing the bill of a recently killed bird in hot water, he was enabled to detach from the exterior covering of the bill a horny substance, which filled its whole cavity, consisting of a delicate net-work of bony matter in the interior, surrounded by thin plates of the same material. On these bony partitions a great number of blood-vessels are distinctly ramified in the living animal. This gentleman favoured me with a specimen thus prepared; in carefully examining which, I found that the nostrils conducted to the internal cells of the substance within the upper mandible.

mandible. From this observation, and the great vascularity of the part, I concluded that the bill is *not* an useless incumbrance, as Buffon rashly conjectured; but that it is an admirable contrivance of nature to increase the delicacy of the organ of smell, in a species whose residence and habits require great nicety in that sense. As the animal is incapable of either tearing or bruising its food, it necessarily must feed on small substances. Its aliment is said chiefly to consist of small fruits or seeds; and for readily attaining these in the wilds of almost impenetrable forests, an acute organ of smell is no doubt requisite. Instead, then, of regarding the bill of the Toucan as an useless load, I am disposed to consider it as an instance of that wisdom and contrivance which attentive observation every where discovers in the works of nature.

I am, Sir,

With the highest esteem and respect, &c.

Liverpool,
January 21, 1814.

THOS. STEWART TRAILL.

XXVIII. *Re-*

XXVIII. *Remarks on the Bryum marginatum and Bryum lineare of Dickson. By Sir James Edward Smith, M.D. F.R.S. P.L.S.*

Read April 19, 1814.

Having, within a few days past, had occasion to advert to the study of Mosses, I met with a remark of Bridel upon the subject of Mr. Dickson's labours in this department of Botany, which, though of no great importance, requires correction; especially as the learned reviewer of Bridel's work in the *Annals of Botany, vol.* ii. 333, has given it his tacit assent. After commending, in general terms, the labours of our great cryptogamic botanist, Bridel accuses him of having sometimes published, as new mosses, what had really been described by other writers. The only instances given are two. *Bryum marginatum* of Dickson he rightly indeed says is *B. serratum* of Schrader; and *B. lineare* is nothing else than *Dicranum pellucidum.* The reviewer properly indicates that the last of these observations is not correct. Indeed so incorrect is this remark, that the plant of our countryman is a *Trichostomum*, the *lineare* of *Fl. Brit.;* Mr. Dickson, though so despised by some critics, and by Bridel amongst them, for not attending to the *peristomium*, having, by his consummate skill of observation, distinguished by their other characters these two mosses, which his critics, it seems, confound. Nor is it a sufficient apology for the great author of the *Muscologia* to say (with the reviewer) that Mr. Dickson's figure of his *Bryum lineare* is such as to justify the mistake. The figure is, indeed, though correct

rect as far as it goes, not sufficient in such a difficult case to found any judgment upon. Bridel surely must have seen a specimen, or he would have prudently limited his assertion to the figure only.

But it is on the subject of Mr. Dickson's *Bryum marginatum* that I now wish to defend him. This is indeed the *serratum* of the learned Schrader, communicated by that author to Gmelin, who first published it in his edition of the Linnæan *Systema Naturæ*, vol. ii. part 2, 1330, under the name of *Mnium serratum*. Professor Schrader himself afterwards removes it to *Bryum*, in his *Spicilegium*, p. 71. Now the first part of Gmelin's second volume was not published till 1791, and the second part perhaps rather later; nor did Schrader's *Spicilegium* come out till 1794. But Mr. Dickson's second fasciculus, where his *B. marginatum* is described and figured, was published in 1790, so that the charge against him falls to the ground; and if we were disposed to throw any blame on so great and so candid a man as the present Gottingen Professor, we might say that he ought not to have omitted, in his *Spicilegium*, a reference to a standard cryptogamic work, published four years before.

Far be it from me, however, to insist on any such charges. My aim is only to justify my venerable friend, my master in this line of study; a task I the more readily undertake, as he is doubtless better employed than in thinking on the subject.

Norwich, J. E. Smith.
April 18, 1814.

XXIX. *Some Observations on the Sea Long-worm of Borlase,* Gordius marinus *of Montagu. By the Rev. Hugh Davies, F.L.S.*

Read June 7, 1814.

As the concise definition of the genus *Gordius*, in the *Systema Naturæ*, does by no means include the characters of this very extraordinary animal, I deem it necessary to give the following more comprehensive one of it under the other name which has been bestowed on it.

Lineus longissimus. *Sowerby's Brit. Misc. p.* 15. *t.* viii.
Black Line-worm.

Corpus lineare, lævissimum, longissimum, mirandum in modum exertile et retractile.
Caput antice emarginatum, proboscidem cylindrico-clavatam exserens.
Os inferum, lineare, longitudinale.
Oculi nulli.

This is the *Gordius marinus* of Mr. Montagu, *Trans. Linn. Soc.* vii. *p.* 72; and *Brit. Zool. ed.* 1812, iv. *p.* 74; but not *Gordius marinus* of Linnæus.

I laid a perfect specimen of this very wonderful creature in its own element in the largest dish I have, with a design to observe its habits or manners.

It partook in a great measure of the nature of the leech, and seemed in some degree amphibious; as it frequently, in part, left the water, and, to the length of a foot or two, or more, extended itself along the edge of the dish, and the table on which the dish

was

was placed. At other times, particularly in the day-time, it was compactly collected together in a heap, and perfectly still, unless the dish or table was touched, of which it seemed very sensible. This it indicated by a vibratory motion of its whole mass, and retracting the head and forepart, which were generally somewhat extended. In the night I always found it coiled in a more lax and diffuse manner, covering nearly the whole dish; but on the approach of a candle it seemed affected, and inclined to contract itself; so that, although I could not see that it had eyes, I evidently discerned that it was very sensible of light. It frequently by morning assumed somewhat of a spiral or screw-like form; and on one morning in particular I was highly gratified in finding it almost perfectly and closely spiral from end to end. I was forcibly struck with this appearance, as it seemed to suggest to me the solution of a difficulty which perplexed me much, concerning the manner how such a wonderfully soft, delicate and seemingly unmanageable length of body could possibly move itself from one place to another. But from the moment when I observed this, I became perfectly at ease with regard to that particular, being convinced that this must be the state which the creature assumes when disposed to change its station; not only as thus it is contracted, with regard to length, into the most compact size which its make is susceptible of, but likewise that, when so modified, every spire or volution, by a distinct impulse exerted in an appropriate manner, will assist in the act of progression, and of shifting forward the whole of its amazing length at nearly the same instant.

When I took it up at the sea-side, collecting such an immense length in a confused manner into the confined space of an oyster-shell, (a very large one indeed,) I thought it had been almost impossible to have unravelled it; but it is astonishing to think how

readily it was disentangled, owing to the extraordinary profusion of mucus which nature has provided it with, doubtless for that purpose.

It it impossible to make a guess at the length of it when alive, on account of its constantly extending and contracting itself when touched, and that with such ease as almost to exceed belief. I once observed a part of the fore end extended to a length between two and three feet, along the margin of the dish and the table, which part, on the animal being disturbed, was in a short time contracted, so as not to exceed so many inches; and as I assert that, when it was thus extended, it was full three times the size in diameter which I had seen it of on some other occasions, I may well say that it is capable of extending itself, or of being extended, without any inconvenience, to twenty-five or thirty times the length that it is of at another time.

It varies very considerably in colour as it contracts or extends itself, which is from a dusky to a reddish-brown; but it has, when placed in a strong light, especially in sun-shine, a gloss of a fine rich purple all over; when most contracted it appears nearly black.

Having thus attended to this remarkable animal for a fortnight, giving it daily a fresh supply of sea-water, I put it into a bottle, which, by the by, though the bottle was wide-mouthed, I effected with no little trouble, owing to its facility of extending and contracting itself, and likewise its being so slippery from the quantity of mucus with which it abounds. When, however, this was done, I poured on it some spirits; it was convulsed, and greatly contracted with regard to length, and consequently much enlarged in thickness, though neither nearly to that degree which I had often observed when it was alive; and in an instant, to my great surprise, it projected, from the emarginate part of the front, a pro-

a proboscis which was eight inches in length. It is very strange, that during the space of time above stated, and the various treatment which the creature had experienced, as well as the different attitudes and states I had seen it in, it never in the least exhibited this part of itself till in its dying convulsion.

It being, as I have before observed, impossible while the animal was alive to make any reasonable conjecture as to the length and breadth of it, I took it out of the bottle, and, on measuring it, found it full *two-and-twenty feet* long, exclusive of the proboscis.

Now, after the various and repeated observations which I have made, I give it as my firm opinion, that I speak within bounds when I say the animal, when alive, might have been extended to four times, at least, its length when dead. I therefore look on what Mr. Sowerby gives, on the authority of the fishermen at Newhaven, to be by no means improbable, viz. that this most astonishing creature may have been known to be susceptible of being drawn to the length of *twelve fathoms;* or, according to the account of the fishermen on the south coast of Devonshire, to Mr. Montagu, to *thirty yards* or *fifteen fathoms.* Indeed Mr. Montagu's own account, of one of the length of *eight feet* when alive, being reduced to *one foot* when immersed in spirits, does more than support my opinion.

This subject and another specimen were found beneath the Green, near Beaumares, at the time of spring-tides, in the month of March 1812.

XXX. *A*

XXX. *A Description of several New Species of Plants from New Holland. By Edward Rudge, Esq. F.R.S. A.S. and L.S.*

Read February 19, 1811.

DODONÆA CUNEATA.

Octandria monogynia.

Tab. XIX.

DODONÆA caule parum angulato, foliis late obcuneatis, acuminulatis.

Frutex erectus: *Rami* teretiusculi, glabri.

Folia alterna, late obcuneata, apice retusa cum parvo acumine, basi in petiolum brevissimum attenuata.

Paniculæ terminales, et ex axillis supremis, erectæ, multifloræ, ramis ramulisque divaricatis.

Flores numerosi.

Calyx tetraphyllus, utrinque tomentosus, foliolis ovatis, patentibus.

Corolla nulla.

Stamina octo. *Filamenta* brevissima, basi germinis inserta. *Antheræ* bilobæ, ovatæ, parum incurvæ, sulcatæ, calyce paulo longiores.

Pistillum: *Germen* triquetrum, basi villosum. *Stylus* crassus. *Stigma* simplex.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB.

Dodonæa cuneata.

Weddell Sc.

Dodonæa asplenifolia.

Weddell Sc.

TAB. XIX. Planta magnitudine naturali.
a. Flos integer.
b. Calyx cum Pistillo.
c. Antheræ fronte et latere visæ.
d. Pistillum.

DODONÆA ASPLENIFOLIA.

Tab. XX.

D. foliis oblanceolatis, basi in petiolum attenuatis, apice tridentatis; floribus terminalibus axillaribusque; ramis triquetris.

Frutex erectus, caule ramisque acute angulatis.

Folia sesqui ad duos et dimidium pollices longa, oblanceolata, apice sæpius tridentata, valde gummosa, uninervia.

Flores numerosi, paniculati, in axillis supremis terminalibusque erecti.

Calyx tetraphyllus, extus dense pubescens, foliolis ovatis, patentibus.

Corolla nulla.

Stamina octo, interdum novem. *Filamenta* brevia, crassa, basi germinis inserta. *Antheræ* oblongæ, bilobæ, arcuatæ, sulcatæ, apice acuminatæ, conniventes.

Pistillum: Germen trilobum, hispidum. *Stylus* triqueter.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB. XX. Planta magnitudine naturali.
a. Flos integer.
b. Calyx cum Pistillo.
c. Antheræ fronte, dorso et latere visæ.
d. Pistillum.

PHILO-

PHILOTHECA.

CHARACTER GENERIS. Omnia ut in Eriostemone, sed Habitus longe alius ericoideus ramis cicatrizatis; Flores terminales et Filamenta inferne dilatata in Thecam nudam, unde nomen.

PHILOTHECA AUSTRALIS.

Monadelphia decandria.

Tab. XXI.

P. foliis linearibus, obtusis; floribus terminalibus.

Eriostemon salsolifolia, *Smith in Rees Cycl.*

Frutex erectus, ramosus.

Caulis teres.

Rami longi, oppositi, divergentes, angulati, inferne cicatricibus seabri.

Folia numerosissima, fere imbricata, brevissime petiolata, linearia, carnosa, obtusa, supra plana, subtus convexa, glandulis parvis aspersa.

Flores terminales, pedunculati, pedunculis basi minute bracteatis.

Calyx quinquefidus, laciniis ovatis.

Petala quinque, sessilia, patentia, recurva.

Stamina: Filamenta decem, quinque longiora, inferne in thecam fere glabram connata, inde villosa. *Antheræ* ellipticæ, apice obtuso.

Pistillum: Germen quinquelobum. *Stylus* staminibus brevior, villosus. *Stigma* obtusum.

Capsulæ duæ vel tres perfectæ, ovatæ, compressiusculæ, acuminatæ, rugosæ, introrsum dehiscentes.

Semina solitaria, reniformia, arillata, atra.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB.

Philotheca australis

Weddell Sc

Darwinia fascicularis.

Weddell Sc

TAB. XXI. Planta magnitudine naturali.
a. Flos integer magnitudine auctus.
b. Stamina, petalis demptis.
c. Pistillum auctius.
d. Filamenta cum antheris.
e. Anthera cum filamento.
f. Capsulæ.
g. Capsula antice et postice visa.
h. Capsula dehiscens.
i. Semen cum arillo.
k. Idem arillo dempto.

DARWINIA.

Decandria monogynia.

Character Generis.

Calyx nullus.

Corolla monopetala, infundibuliformis: *tubus* sub apice ventricosus, ad faucem parum coarctatus: *limbus* quinquepartitus, laciniis ovatis, acutis, imbricatis.

Staminum Filamenta decem, brevia, prope tubi apicem duabus seriebus inserta; harum quinque laciniis opposita, deinde corollæ tubo adnata: *Antheræ* reniformes.

Germen superum parum unilaterale, compressum. *Stylus* corollâ plusquam duplo longior. *Stigma* simplex.

DARWINIA FASCICULARIS.

Tab. XXII.

D. foliis linearibus, fasciculatis; capitulis terminalibus.

Frutex ramosissimus, ramis teretibus.

Caulis erectus, fruticosus, valde ramosus, ramis scabris.

Folia numerosissima, linearia, apice subulata, densissime fasciculata, undique punctulis numerosis extantibus glanduloso-punctata subincurva.

Flores terminales, glabri, in capitulis densissime congesti.

Calyx nullus.

Corolla monopetala, infundibuliformis : *tubus* sub apice ventricosus, versus faucem ampliatus et infra parum coarctatus : *limbus* quinquepartitus, laciniæ ovatæ, apice acutæ.

Stamina : *Filamenta* decem, brevia, fauce tubi inserta.

Pistillum : *Germen* læve. *Stylus* filiformis, plusquam duplo corollâ longior. *Stigma* simplex.

Fructum non vidi.

Habitat prope Port Jackson in Novâ Hollandiâ.

I have named this Genus in honour of the late Erasmus Darwin, M.D. of Litchfield, Author of The Botanic Garden, Zoönomia, and a Translation of the Systema Vegetabilium of Linnæus, by a Botanical Society at Litchfield.

TAB. XXII. Planta magnitudine naturali.
a. Flos integer magnitudine ampliatus.
b. Corolla aperta.
c. Anthera dorso et fronte visa.
d. Pistillum.

PULTENÆA FERRUGINEA.

Decandria monogynia.

Tab. XXIII.

P. foliis obovatis ob curvaturam quasi emarginatis, pilosis; floribus axillaribus terminalibusque.

Frutex

Pultenæa ferruginea.

Weddell Sc.

Frutex ramosissimus.

Caulis teres, pilo albo densissime tecta.

Folia numerosa, alterna, ovata, sub lente punctata, utrinque pilosa.

Stipulæ ad basin foliorum duæ, subulatæ, in membranam adeo dilatatæ, ut fere contiguæ.

Flores axillares et terminales, pedunculo brevi tereti piloso.

Bracteæ duæ, calyce insertæ, lacinias duas exteriores ejusdem simulantes.

Calyx quinquepartitus, pilosus, laciniis inæqualibus acutis, superioribus duabus approximatis.

Corolla papilionacea, pentapetala, imo calyce inserta, petalis unguiculatis, vexillum subrotundum, alæ oblongæ, carina alarum longitudine, monopetala unguibus distinctis.

Stamina: Filamenta decem, distincta, filiformia, incurva, sub petalis inserta. *Antheræ* biloculares.

Pistillum: Germen ovatum, pilosum. *Stylus* filiformis staminum longitudine. *Stigma* simplex recurvatum.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB. XXIII. Planta magnitudine naturali.

a. Flos integer magnitudine ampliatus.

b. Petala.

c. Calyx apertus et parte exteriore visus, cum bracteis duabus adnatis.

d. Stamina.

e. Pistillum.

f. Filamentum cum Antherâ.

g. Folium dorso et fronte visum.

PULTE-

PULTENÆA ELLIPTICA.

Tab. XXIV.

P. foliis ellipticis, subtus rare sericeis, concavis, dense imbricatis: stipulis sericeis; floribus axillaribus, terminalibusque.

Pultenæa elliptica, *Smith, Linn. Tr. vol.* 9. *p.* 246.

Frutex ramosissimus.

Caulis villis albis sericeus.

Folia numerosissima, dense imbricata, elliptica, concava, petiolata; supra glabra; subtus rarè sericea, et punctis numerosis minutissimis tuberculata.

Stipulæ cauli adpressæ, subintrafoliaceæ, villis albis longis sericeæ, sulcatæ.

Flores numerosi, axillares et terminales, pedunculo brevissimo.

Calyx monophyllus, quinquefidus, villosus; laciniis inæqualibus acutis; duabus superioribus latioribus, et brevioribus.

Corolla papilionacea, tetrapetala: *Vexillum* subrotundum, erectum; *Alæ* oblongæ; *Carina* monopetala, alarum longitudine, unguiculata.

Stamina: Filamenta decem, distincta, filiformia, incurva, receptaculo inserta. *Antheræ* biloculares.

Pistillum: Germen ovatum, pilosum. *Stylus* filiformis, incurvatus, staminum longitudine. *Stigma* simplex.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB. XXIV. Planta magnitudine naturali.
a. Flos integer parum ampliatus.
b. Petala.
c. Calyx apertus.
d. Pistillum.
e. Filamentum cum Antherâ.

PULTE-

Pultenæa elliptica.

Linn. Trans. Vol. XI. Tab. 25 p. 303.

Pultenæa polygalifolia.

Pultenæa polygalifolia.

Tab. XXV.

P. foliis oblongis, obtuse mucronulatis; floribus axillaribus terminalibusque.

Frutex erectus, ramosus, ferrugineus.

Caulis teres, pubescens; rami ramulosi, alterni, erecti, patentes.

Folia alterna, oblonga, breviter petiolata, uninervia, patentia, integerrima, obtuse mucronulata, inferne attenuata, ferruginea; petioli purpurascentes.

Stipulæ geminæ, oppositæ ad basin foliorum, subulatæ.

Flores sparsi, axillares et terminales, pedunculati.

Calyx monophyllus, quinquepartitus, laciniis ovatis, subæqualibus, acutis.

Corolla papilionacea, glabra, tetrapetala: *Vexillum* subrotundum, limbo erecto, emarginato, inferne in unguem attenuatum: *Alæ* vexillo longiores, oblongæ: *Carina* monopetala, alarum longitudine, unguiculata.

Stamina: Filamenta decem, libera, filiformia, receptaculo inserta. *Antheræ* subrotundæ, biloculares.

Pistillum: Germen ovatum, pilosum. *Stylus* directione et longitudine staminum, subulatus. *Stigma* simplex, acutum.

Legumen parvum, subrotundum, gibbum, acuminatum, compressiusculum, uniloculare, seminibus duobus reniformibus.

Habitat prope Port Jackson in Novâ Hollandiâ.

Tab. XXV. Planta magnitudine naturali.
a. Flos integer magnitudine auctus.
b. Petala.
c. Calyx.
d. Pistillum.

d. Pistillum.
e. Filamentum.
f. Legumen.
g. Idem valvulis expansis, seminibus conspicuis.

ERIOSTEMON SALICIFOLIA.

Decandria monogynia.

Tab. XXVI.

E. foliis alternis, spatulatis; floribus solitariis, axillaribus.
Eriostemon Salicifolia, *Smith in Rees's Cyclop.*

Frutex ramis patentibus, ramulis angulatis.

Caulis rectus, angulatus, minute hirtus.

Rami longi alterni, divergentes.

Folia alterna, sessilia, spatulata, apice obtusa, subtus glandulis parvis punctata, avenia, nervo autem sæpe juxta marginem conspicuo.

Flores solitarii, axillares, brevissime pedunculati.

Pedunculi bracteati.

Bracteæ tres vel quatuor, ovales, margine membranaceæ.

Calyx quinquefidus: laciniis obovatis, margine fimbriatis.

Petala quinque, sessilia, patentia, ovato-lanceolata, margine subciliata, germinis basin arcte cingentia.

Stamina: Filamenta decem, quinque longiora, subulata, sub disco inserta, ad basin villosa. *Antheræ* medio filamentorum adnatæ, ovatæ, biloculares.

Pistillum: Germen superum, subrotundum, sulcatum, toro repando cinctum. *Stylus* brevis, villosus. *Stigma* obtusum.
Variat foliis duplo latioribus quam in Icone nostrâ.

Habitat prope Port Jackson in Novâ Hollandiâ.

TAB.

Eriostemon salicifolia.

Vedde Sc.

TAB. XXVI. Planta magnitudine naturali.

a. Flos integer magnitudine naturali.

b. Calyx cum staminibus.

c. Idem magnitudine auctus.

d. Filamentum et Anthera.

e. Pistillum.

XXXI. *A tabu-*

XXXI. *A tabular View of the external Characters of Four Classes of Animals, which Linné arranged under* INSECTA; *with the Distribution of the Genera composing Three of these Classes into Orders, &c. and Descriptions of several New Genera and Species. By William Elford Leach, M.D.*

Read April 19, *May* 3, *and June* 1, 1814.

THE object of this paper is chiefly to call the attention of Entomologists to examine into the propriety of constituting a new class to comprehend the *Syngnatha* and *Chilognatha* of Fabricius, which Latreille and Lamarck have arranged with the *Arachnides.*

As the leading characters of the classes which were considered by Linné as Insecta are very obvious, I shall in the first place content myself with submitting to the Society the external characters, through the medium of a table, and shall then consider three of the classes separately.

All the animals in question agree in having articulated limbs for motion, and they all have their spinal mass of nerves composed of ganglia, which are formed as it were on a cord; or, in other words, are brought into communication with each other.

By the following table the most obvious points of distinction may readily be learnt.

A. *Bran-*

A. *Branchiis pro respiratione.*

Classis I.	- - - - - - - - - - - -	CRUSTACEA.

B. *Tracheis pro respiratione.*

Classis II.	Pedibus ultra 8. Capite distincto; antennis 2.	MYRIAPODA.
Classis III.	Pedibus 6 aut 8. Capite thoraceque coalitis; antennis 0.	ARACHNIDES.
Classis IV.	Pedibus 6. Capite distincto; antennis 2.	INSECTA.

Classis I. CRUSTACEA.

The *Crustacea* are arranged by Latreille into two orders, viz. *Entomostraca* and *Malacostraca*. These orders in my opinion should rather be considered as subclasses; to the latter of which the *Tetracera* (placed by Latreille with the *Arachnides*) may be added, as they agree with the sessile-eyed *Malacostraca* in every essential point of internal organization.

The *Entomostraca* are but little known, and consequently their arrangement is extremely imperfect.

The *Malacostraca* have occupied a very considerable portion of attention, the result of which shall be given in the following pages.

Subclassis. MALACOSTRACA.

Legio I. PODOPHTHALMA. Oculi pedunculati.
Ordo I. BRACHYURA. Cauda brevis, inermis.
Ordo II. MACROURA. Cauda elongata, appendiculata.
Legio II. EDRIOPHTHALMA. Oculi sessiles.

Legio I. PODOPHTHALMA.

Ordo I. BRACHYURA.

Latreille arranges the *Brachyura* (from the proportional breadth and length of the thorax or shell) into two families; but the discovery of genera unknown to that illustrious entomologist has convinced me that such a distribution is extremely unnatural; and

and although from the infant state of our knowledge I cannot venture to propose named divisions, yet I shall endeavour to dispose the genera into what appear to be natural groups.

A. *Abdomen maris 5-articulatum articulo medio longiore, fœminæ 7-articulatum. Pedes 2 antici didactyli.*	*Genera.*
DIVISIO I. Testa subrhomboidalis. Pedes duo antici longissimi, digitis deflexis.	1. LAMBRUS.
DIVISIO II. Testa postice truncata. Pedes duo antici maris elongati, fœminæ mediocres.	
Subdivisio 1. Antennæ elongatæ utrinque ciliatæ.	
Testa elongato-ovata. Pedipalpi gemini externi articulo secundo longiore.	2. CORYSTES.
Testa subcircularis; orbita integra. Ungues acuti, flexuosi. Pedipalpi gemini externi caulis interni articulo secundo breviore.	3. THIA.
Testa subcircularis; orbita fissuris 2. Ungues recti. Pedipalpi gemini externi caulis interni articulo secundo longiore.	4. ATELECYCLUS.
Subdivisio 2. Antennæ mediocres simplices. Pedes postici unguibus compressis, natatoriis.	
Orbita integra. Ungues omnes compressi.	5. PORTUMNUS.
Orbita superne fissura 1. Ungues postici subcompressi, acuti.	6. CARCINUS.
Orbita superne fissuris 2. Ungues postici valde compressi. Pedes 2 antici inæquales.	7. PORTUNUS.
Orbita superne fissuris 2. Ungues postici valde compressi. Pedes 2 antici æquales.	8. LUPA.
Subdivisio 3. Antennæ mediocres simplices. Pedes 8 postici natatorii.	9. MATUTA.
Subdivisio 4. Antennæ simplices, breves. Pedes 8 postici consimiles, simplices.	
Pedes 2 antici simplices, inæquales. Antennæ externæ inter oculorum canthum et frontem insertæ.	10. CANCER.
Pedes 2 antici simplices, inæquales. Antennæ in oculorum cantho interno insertæ.	11. XANTHO.
Pedes 2 antici cristati, æquales.	12. CALAPPA.
B. *Abdomen in utroque sexu 7-articulatum. Pedes duo antici didactyli.*	

DIVISIO

Divisio III. Pedes 8 postici simplices, consimiles.

Subdivisio 1. Testa antice arcuata, lateribus in angulum convergentibus. (Pedes duo antici inæquales).	*Genera.*
Pedipalpi gemini externi caulis interni articulo secundo ad apicem internum palpigero. Ungues et tibiæ inermes.	13. Pilumnus.
Pedipalpi gemini externi caulis interni articulo secundo subtus palpigero. Ungues et tibiæ spinosæ.	14. Gecarcinus.
Subdivisio 2. Testa quadrata aut subquadrata. Oculi fronte inserti.	
* Testa subquadrata oculi pedunculo brevi.	
Pedipalpi gemini externi cauli interno uniarticulato.	15. Pinnotheres.
** Testa quadrata oculi pedunculo elongato.	
Oculi pedunculo ultra illorum apicem producto. Pedes 2 antici inæquales.	16. Ocypode.
Oculi pedunculo ultra illorum apicem non producto. Pedes 2 antici inæquales.	17. Uca.
Oculi pedunculo ultra illorum apicem non producto. Pedes 2 antici æquales.	18. Goneplax.
Subdivisio 3. Testa subquadrata. Oculi ad angulos anticos inserti.	19. Grapsus.

Divisio IV. Pedes duo postici saltem dorsales.

Subdivisio 1. Pedes duo postici dorsales. Oculi pedunculo biarticulato.	20. Homola.
Subdivisio 2. Pedes quatuor postici dorsales. Oculi pedunculo uniarticulato.	
Pedes quatuor postici monodactyli.	21. Dorippe.
Pedes quatuor postici didactyli.	22. Dromia.

Divisio V. Testa antice rostrata. Pedes 8 postici simplices, consimiles.

Subdivisio 1. Digiti deflexi.	23. Eurynome.
Subdivisio 2. Digiti haud deflexi.	
* Antennæ externæ articulo primo externe haud dilatato.	
a. Pedum par anticum aliis vix crassius.	
Antennæ externæ articulis duobus primis subæqualibus. Testa spinosissima.	24. Maia.
b. Pedum par anticum aliis distincte crassius.	
Ungues interne denticulati. Testa villosa.	25. Pisa.

** Antennæ

** Antennæ externæ articulo primo externe dilatato.	*Genera.*
Testa subtuberculata, lateribus pone oculos hastato-productis.	26. HYAS.
C. *Abdomen in utroque sexu 6-articulatum. Pedes 2 antici didactyli.*	
DIVISIO VI. Pedes parium 2, 3, 4 et 5 consimiles, graciles.	
Subdivisio 1. Oculi retractiles.	27. INACHUS.
Subdivisio 2. Oculi nudi haud retractiles.	
Rostro fisso.	28. MACROPODIA.
Rostro integro.	29. LEPTOPODIA.
DIVISIO VII. Pedum par quintum minutum, spurium.	30. LITHODES.
D. *Abdomen* fœminæ (marisque?) 5-*articulatum.* (Testa antice rostrata.)	31. PACTOLUS.
E. *Abdomen in utroque sexu 4-articulatum. Pedes 2 antici didactyli.*	
Testa rotundata aut subrhomboidalis.	32. LEUCOSIA.
Testa transversissima, cylindrica.	33. IXA.

DIVISIO I.

Abdomen MARIS 5-articulatum articulo medio longiore; FŒMINÆ 7-articulatum. *Testa* rhomboidalis. *Antennæ* exteriores simplices. *Pedipalpi gemini externi* caulis interni articulo secundo latere interno emarginato pro insertione palporum. *Pedes* duo antici didactyli longissimi; digitis deflexis; pedes alii simplices, consimiles.

Gen. 1. LAMBRUS.

MAJA, *Bosc, Latreille.*

Spec. 1. *Lambrus longimanus.*

Maja longimana, *Bosc Hist. Nat. des Crust.* i. 250.

DIVISIO II.

Abdomen MARIS 5-articulatum articulo medio longiore: FŒMINÆ 7-articulatum. *Testa* postice truncata: *Antennæ exteriores* triarticulatæ

triarticulatæ articulo ultimo e segmentis plurimis minutis efformato. *Pedipalpi gemini externi* caulis interni articulo secundo latere interno emarginato aut apice interno truncato. *Pedes* duo antici didactyli, maris longiores.

SUBDIVISIO 1.

Antennæ longissimæ utrinque ciliatæ. Pedum paria 2, 3, 4 et 5 consimilia; par anticum digitis deflexis.

Gen. 2. CORYSTES, *Latreille.*

ALBUNEA, *Fabr.*

Antennæ exteriores corpore longiores, segmento tertio articulis elongatis, cylindricis. *Pedipalpi gemini externi* caulis interni articulo secundo (primo longiore) angusto apice angustiore rotundato, latere interno late emarginato. *Pedum par anticum* MARIS corpore duplo longius, subcylindricum, manu gradatim subcrassiore, subcompressâ; FŒMINÆ corporis longitudine manu compressa: *paria reliqua* tibiis tarsisque longitudine subæqualibus, unguibus elongatis, rectis, acutis longitudinaliter sulcatis instructa. *Abdomen* MARIS articulo primo lineari transverso, secundo longiore utrinque postice producto, tertio æqualiter subquadrato, quarto præcedente angustiore transverso, quinto angustiore subtriangulari apice rotundato; FŒMINÆ articulis sex primis transversis antice arcuatis, quinto triangulari apice rotundato. *Testa* oblongo-ovata antice subrostrata, postice marginata. *Oculi* pedunculo reclivi haud crassiores; *orbita* superne fissurâ unâ.

Spec. 1. *Corystes Cassivelaunus.*

C. testâ granulari postice subcrenulatâ; fronte bifido; lateribus tridentatis.

Cancer Cassivelaunus. *Penn. Brit. Zool.* iv. 6. *t.* 7. ♂ ♀.
Herbst 1. 195. *t.* 12. *f.* 72. ♂.

Cancer

Cancer personatus. *Herbst* 1. 193. *t.* 12. *f.* 71. ♀.
Albunea dentata. *Fabr. Sup. Ent. Syst.* 398.
Corystes dentatus. *Latr. Gen. Crust. et Ins.* 1. 40.
Habitat in Europeo mari.

Gen. 3. Thia.

Antennæ exteriores corpore longiores segmento tertio articulis elongatis cylindricis. *Pedipalpi gemini externi* caulis interni articulo secundo primo multo breviore ad apicem internum truncato-subemarginato. *Pedum par anticum* maris corpore paululum longius manu compressa; *paria* alia tarsis tibiis duplo brevioribus, unguibus acutis, flexuosis longitudinaliter sulcatis. *Abdomen* maris articulo primo transverso arcuato, lineari, secundo paululum longiore antice arcuato-subproducto, tertio valde elongato apicem versus paululum angustiore apice subemarginato, quarto subquadrato apice subemarginato, quinto triangulari. *Testa* subcircularis lateribus sensim postice in angulum convergentibus, postice granulari-submarginata, fronte subproducta. *Oculi* minimi vix prominuli; *orbita* postice haud fissa.

Spec. 1. *Thia polita.*

T. testâ convexâ politâ sparse punctatâ; orbitâ postice emarginatâ; lateribus utrinque obscure quadriplicatis; fronte integrâ arcuatâ.
Cancer residuus. *Herbst* 3. 53. *t.* 48. *f.* 1?

Gen. 4. Atelecyclus.

Cancer (Hippa), *Montagu.*
Antennæ exteriores corporis ad dimidium longitudinis, segmento tertio articulis cylindricis elongatis. *Pedipalpi gemini externi* caulis interni articulo primo breviore ad apicem internum producto et ad latus internum apicem versus emarginato ad pal-

porum

porum insertionem. *Pedum par anticum* maris corpore longius manu compressa; fœminæ corporis longitudine manu compressa; *paria* reliqua tarsis tibiisque longitudine æqualibus, unguibus rectis, elongatis, quadratis, longitudinaliter sulcatis, acutis ad apices teretibus nudis (posticis obscure subcompressis). *Abdomen* maris articulo primo transverso, lineari, secundo duplo longiore, tertio valde elongato apicem versus angustiore apice subrecto, quarto subquadrato angulis anticis productis, quinto lageniformi apice acutissimo; fœminæ articulis 1, 2, 3, 4 et 5 transversis longitudine vix diversis, articulo sexto transverso-quadrato antice emarginato, articulo ultimo elongato-subtriangulari postice subproducto. *Testa* subcircularis lateribus sensim postice in angulum convergentibus postice truncata et granulari-marginata. *Oculi* pedunculo angustiores; *orbita* postice externe fissuris duabus, inferne externe fissurâ unâ.

Spec. 1. *Atelecyclus septemdentatus.*

Cancer *hippa* 7-dentatus. *Montagu Linn. Trans. vol.* xi. *tab.* 1.
Habitat in Danmoniæ mari profundo.

subdivisio 2.

Antennæ simplices, mediocres. Pedum paria 2, 3 *et* 4 *consimilia, unguibus acutis; par quintum compressum, natatorium.*

Gen. 5. Portumnus.

Cancer, *Planci, Penn., Herbst.*

Oculi pedunculo haud crassiores; *orbita* integra. *Pedum* par anticum æquale; paria 2, 3 et 4 unguibus compressis interneque basin versus dilatatis; par quintum ungue foliaceo, compresso, lanceolato. *Abdomen* maris articulo quarto elongato. *Testa* diametro transverso longitudinalem æquante.

Spec. 1.

Spec. 1. *Portumnus variegatus.*

P. testâ obscure subgranulatâ, utrinque 5-dentatâ dentibus 2 et 3 subobsoletioribus; fronte 3-dentatâ; carpis interne unidentatis.

Portumnus variegatus. *Leach, Edin. Encycl.* vii. 391.

——, *Malac. Podophth. Brit. t.* iv. ♂ *et* ♀.

Cancer *latipes* variegatus. *Planc. de Conch. min. notis, p.* 34. *tab.* iii. *fig.* 7. B. C. ♂.

Cancer latipes. *Penn. Brit. Zool.* iv. *p.* 3. *tab.* 1. *fig.* 4. ♀.

Cancer Lysianassa. *Herbst* 54. *fig.* 6?

Habitat in littoribus arenosis Britanniæ vulgatissime.

Spec. 2. *Portumnus monodon.*

P. testâ obscure subgranulatâ, lateribus utrinque unidentatis; fronte tridentatâ; carpis interne unidentatis.

Habitat ——.

Mus. Brit.

Ad hoc genus Cancer latipes Herbst (i. 267. *tab.* xxi. *fig.* 126.) pertinere videtur.

Gen. 6. Carcinus.

Cancer *auctorum.*

Oculi pedunculo angustiores; orbita postice et inferne unifissa. *Pedum* par anticum inæquale manibus externe glabris; par posticum compressum, subnatatorium. *Abdomen* maris articulo quarto transverso præcedente vix angustiore. *Testa* (diametro transverso submajore) utrinque 5-dentata.

Spec. 1. *Carcinus Mænas.*

C. testâ granulari; fronte tridentatâ; lateribus 5-dentatis.

Cancer Mænas *auctorum.*

Gen. 7. PORTUNUS, *Fabr., Latr., Bosc, &c.*

Oculi pedunculis multo crassiores; *orbita* postice fissuris duabus, inferne externe fissurâ unicâ. *Abdomen* MARIS articulo quarto transverso. *Pedum* par anticum subinæquale, manibus externe elevato-lineatis, brachiis sæpius inermibus; par posticum compressum, natatorium, foliaceum. *Testa* (diametro transverso submajore) utrinque 5- (rarius 6-) dentata.

* *Ungues postici lineâ elevatâ longitudinali; palporum geminorum externorum caulis interni articulus secundus ad apicem internum truncatus.*

a. Orbita interne ad oculorum insertionem imperfecta; carpis bidentatis.

Spec. 1. *Portunus puber.*

P. antennis corporis dimidio longioribus, testâ pubescente, fronte multidentato.

Cancer puber. *Linn.* Cancer velutinus. *Penn.* Portunus puber. *Latr.*

Habitat in oceano Europæ.

b. Orbita interne subimperfecta; carpis unidentatis.

Spec. 2. *Portunus corrugatus.*

P. testâ convexâ, lineis transversis serrato-granulatis ciliatis utrinque 5-dentatis: dentibus tribus posticis acutioribus, fronte trilobo, lobis subgranulato-serratis: medio majore subacuminato, manibus supra unidentatis, unguibus posticis apice acutis.

Cancer corrugatus. *Pennant, Herbst.*

Portunus corrugatus. *Leach, Edin. Encycl.* vii. 390.

Habitat in Britannia rarissime.

Mus. Montagu, Nost.

Mr. C. Prideaux sent me the young of this species from the Plymouth Sound.

The fissure in the under part of the orbit is wide enough to admit a knife; in the two following species the sides of the fissure touch each other.

Spec. 3. *Portunus emarginatus.*

P. testâ convexiore lineis abbreviatis e granulis compositis, dentibus tribus utrinque: penultimo minore, fronte emarginato, manibus supra unidentatis, unguibus posticis acutis.

Portunus emarginatus. *Leach, Edin. Encycl.* vii. 390.

Habitat ad Danmoniæ littora, semel obvius.

Mus. Nostr. ♀.

Abdomen FŒMINÆ latum, tenuè ciliatum, angustius quam in *P. Depuratore,* articulo penultimo minus arcuato, ultimo angustiore, acutiore, secundo tertioque minus carinatis, quarto vix carinato.

Spec. 4. *Portunus arcuatus.*

P. testâ convexiore lineis abbreviatis e granulis compositis, dentibus utrinque tribus; penultimo minore, fronte arcuato integro, manibus supra unidentatis, unguibus posticis acutis.

Portunus arcuatus. *Leach, Edin. Encycl.* vii. 390.

Testæ fronte arcuato integro, a Portuno emarginato tantum differt; forte varietas?

Habitat in Angliæ mari rariùs.

Mus. Sowerby, Leach. ♂.

** *Ungues postici ecostati; palporum geminorum externorum caulis interni articulus secundus ad latus internum emarginatus; orbita internè sub antennæ externæ insertione imperfecta.*

Spec. 5. *Portunus marmoreus.*

P. testâ convexâ obsoletè tenuè granulata, utrinque dentibus quinque

que subæqualibus, fronte dentibus tribus æqualibus apice rotundatis, manibus glabris supra unidentatis, tarsis posticis apice acutioribus.

Cancer *pinnatus* marmoreus. *Montagu, Mss.*

Portunus marmoreus. *Leach, Edin. Encycl.* vii. 390.

———, *Malac. Podophth. Brit. tab.* viii.

Habitat ad Danmoniæ Australis littora frequens.—Detexit Montagu.

Abdominis articuli 2 et 3 transversim carinati.

Spec. 6. *Portunus Depurator.*

P. testâ subcomplanatâ lineis elevatis obliquis et transversis abbreviatis e granulis compositis, utrinque dentibus quinque: secundo breviore: postico subremotiore, fronte dentibus tribus: medio subacutiore sublongiore, manibus supra unidentatis, tarsis posticis apice acutioribus sæpe subemarginatis.

Cancer Depurator. *Linn. Syst. Nat.* xii. 1043. 23.

Fab. Ent. Syst. ii. 451. 44.

Cancer depurator, var. *Penn. Brit. Zool.* iv. *tab.* iv. *fig.* 6. A.

Portunus depurator. *Fab. Sup. Ent. Syst.*

Habitat in oceano Europæo frequentissime.

Abdomen MARIS triangulare; FŒMINÆ latum, late ciliatum, articulis 3, 4, 5 et 6 basilaribus latioribus, penultimo lateribus arcuatis, ultimo præcedente abrupte angustiore.—Abdominis articuli 2-3 in utroque sexu (maris præsertim) transversim acute carinatis.

Spec. 7. *Portunus lividus.*

P. testâ complanatâ tenuè subgranulatâ utrinque dentibus quinque: secundo subbreviore: postico remotiore, fronte dentibus tribus acutis: medio longiore, manibus supra unidentatis, tarsis posticis apice abrupte producto.

 Cancer

Cancer depurator. *Penn. Brit. Zool.* iv. *tab.* ii. *fig.* 6??
Portunus lividus. *Leach, Edin. Encycl.* vii. 390.
Habitat in oceano Scotico; apud Newhaven prope Edinburgum semel tantum obvius.
Abdomen FŒMINÆ articulis 4-5 abrupte angustioribus, penultimo quinto paululum latiore lateribus arcuatis, ultimo penultimo subabrupte angustiore; MARIS articulo tertio ad apicem dilatiore; quarto ad basin paululum dilatato; ultimo penultimo subabrupte angustiore.

This species a good deal resembles *P. Depurator* at first sight; but a very slight examination will evince the characteristic distinctions. The surface is minutely granulated, the shell is narrower behind, the eyes smaller, and the antennæ shorter.

When alive the shell was livid, with a slight tinge of blueish, the hinder feet of the same colour. Other feet greenish-livid inclining to blueish. Fingers obscure with white tips.

Spec. 8. *Portunus pusillus.*

P. testâ subrugosâ, fronte productâ trilobâ, lateribus 5-dentatis: dente postico acutiore.
Habitat in mari Danmoniæ Australis; et apud Frith of Forth in Caledonia.

The fingers of this species, which does not exceed an inch in length, are generally annulated with red and white. The back also has often a red streak or spot.

Gen. 8. LUPA.

PORTUNUS. *Fabr., &c.*
Oculi pedunculis multo crassiores; *orbita* supra externe fissuris duabus, inferne externe fissurâ unicâ. *Pedum* par anticum æquale, brachiis antice spinosis; par posticum valde compressum. *Abdomen* MARIS articulo quarto valde elongato præcedente

dente multo angustiore. *Testa* transversa utrinque 9-dentata, dente postico longiore.

* *Testa utrinque spina postica longissima.*

a. Digitis longissimis filiformibus, manibus externe glabris.

Spec. 1. *Lupa Forceps.*

Lupa forceps. *Leach, Zool. Miscel.* i. 123. *tab.* 54.
Portunus forceps. *Fabr., &c.*
Habitat in mari Carribeano.

b. Digitis mediocribus, manibus externe elevato-lineatis.

Spec. 2. *Lupa trispinosa.*

L. testâ granulatâ, brachiis antice trispinosis.
Mus. Brit.

** *Testa spina laterali postica haud longissima.*

Spec. 3. *Lupa Banksii.*

L. pubescens, fronte 4-dentato, brachiis antice 5-dentatis.
Mus. Brit. ex dono Josephi Banks, Baroneti.

SUBDIVISIO 3.

Antennæ simplices mediocres. Pedum paria 2, 3, 4 *et* 5 *unguibus compressis, natatoriis.*

Gen. 9. MATUTA, *Dald., Fabr., Lam., Bosc, Latr.*

Pedipalpi gemini externi cauli interno elongato-subtriangulari, articulo secundo latere interno excavato palpigero. *Pedum* par quartum ungue angustiore, acuto.

Spec. 1. *Matuta Victor.*

Matuta victor. *Latr. Gen. Crust. et Ins.* i. 42. 31. 1.

SUBDIVISIO 4.

Antennæ simplices breves. Pedum paria 2, 3, 4 *et* 5 *consimilia simplicia.*

plicia. Testa transversa, margine antico in lineam semiellipticam arcuato.

Gen. 10. CANCER *auctorum.*

Antennæ externæ breves, inter oculorum canthum internum et frontem insertæ; *internæ* clypei medio in foveolis receptæ, pedunculo sublunari. *Palpi* gemini externi caulis interni articulo secundo ad apicem internum emarginato. *Testa* postice marginata: *orbita* postice fissurâ unicâ externe uniplicatâ, subtus fissurâ unicâ et externe uniplicatâ. *Pedum* par anticum inæquale.

Spec. 1. *Cancer Pagurus.*

C. testâ granulatâ utrinque novemplicatâ, fronte trilobo.

Cancer pagurus *auctorum.*

Gen. 11. XANTHO.

CANCER, *Montagu,* (*Herbst?*)

Antennæ externæ brevissimæ, in oculorum cantho interno insertæ; *internæ* sub clypei prominentis margine antico foveolis receptæ, pedunculo sublineari. *Pedipalpi gemini externi* caulis interni articulo secundo ad apicem internum emarginato. *Testa* postice submarginata. *Orbita* supra integra inferne externe fissurâ unicâ. *Pedum* par anticum inæquale.

Spec. 1. *Xantho florida.*

X. carpis supra bituberculatis, testâ utrinque dentibus quatuor obtusis: interstitiis excisis, digitis nigris.

Cancer floridus. *Montagu, Trans. Linn. Soc.* ix. *p.* 85. *t.* 2. *fig.* 1.

Var. *β.* Digitis concoloribus.

Habitat in Danmoniæ Australis littora passim.

Mr. Montagu has considered this species to be the *Cancer floridus* of Linné; but an examination of the characters in the *Amœnitates*

Amœnitates Academicæ will readily convince the naturalist of the incorrectness of this opinion: nor is this the *floridus* of Herbst; which induces me to believe that some one must have misled Mr. Montagu with regard to the synonym, as he could never have considered them the same had he examined the reference.

Cancer Dodone of Herbst seems to be referable to the genus *Xantho*; and, if his figure be correct, the only distinction is in the number of teeth on the sides of the shell, which in *C. Dodone* is only three.

Gen. 12. Calappa, *Latr., &c*

Pedum par anticum cristatum, æquale.

DIVISIO III.

Abdomen in utroque sexu 7-articulatum. *Pedum* par anticum didactylum; *paria* reliqua consimilia.

SUBDIVISIO 1.

Testa antice arcuata, lateribus in angulum convergentibus. (*Pedum par anticum inæquale*).

Gen. 13. Pilumnus.

Cancer, *Pennant.*

Pedipalpi gemini externi caulis interni articulo secundo minore ad apicem internum truncato-emarginato. *Ungues* simplices, apice nudi.

Spec. 1. *Pilumnus hirtellus.*

Cancer hirtellus. *Penn. Brit. Zool.* iv. *tab.* 6

Gen. 14.

Gen. 14. GECARCINUS.

OCYPODE, *Latr., &c.*

Pedipalpi gemini externi caulis interni articulis duobus subæqualibus; palpi inferne inserti. *Pedum* par anticum inæquale. *Ungues* et tibiæ spinosi.

Spec. 1. *Gecarcinus Ruricola.*

Cancer ruricola. *Linn., Fabr.*
Ocypode tourlourou. *Latr. Herbst, tab.* iii. *fig.* 36.

SUBDIVISIO 2.

Testa quadrata aut subquadrata; oculi fronte inserti.

* Testa subquadrata; oculi pedunculo brevi.

Gen. 15. PINNOTHERES, *Latr., Bosc.*

CANCER, *Linn.*

Antennæ brevissimæ (articulis tribus primis majoribus) in oculorum cantho interno insertæ. *Pedipalpi gemini externi* caulis internus uniarticulatus. *Pedum* par anticum æquale. *Oculi* crassi.

The indigenous species of this interesting genus are described and figured in *Malacostraca Podophthalma Britanniæ* (Tab. 14-15).

** Testa quadrata; oculi pedunculo elongato.

Gen. 16. OCYPODE, *Dald., Fabr., Latr., &c.*

Oculi pedunculo ultra illorum apicem in spinam producto. *Pedum* par anticum inæquale.

Spec. 1. *Ocypode ceratophthalma.* *Fabr., Latr., &c.*

Gen. 17. UCA.

OCYPODE, *Latr., &c.*

Oculi pedunculo ultra illorum apicem non producto. *Pedum* par anticum valde inæquale.

Spec. 1. *Uca Una.*

Cancer vocans major. *Herbst*, i. *tab.* i. *fig.* 10.

Gen. 18. GONEPLAX.

OCYPODA, *Bosc.*

CANCER, *Pennant.*

Oculi pedunculo ultra illorum apicem haud producto. *Pedum* par anticum æquale; MARIS longissimum; FŒMINÆ corpore duplo longius. *Antennæ* corporis dimidio longiores, ad oculorum canthum internum insertæ.

Spec. 1. *Goneplax bispinosa.*

G. testâ utrinque bispinosâ, brachiis supra carpisque interne unispinosis.

Cancer angulatus. *Penn., Fabr.*

Ocypoda angulata. *Bosc.*

Habitat in mari Britannico, apud Salcombe et Plymouth in Danmoniâ, et Redwharf in Monâ.

SUBDIVISIO 3.

Testa subquadrata. Oculi ad angulos externos inserti.

Gen. 19. GRAPSUS, *Lam., Latr.*

Spec. 1. *Grapsus pictus.*

Cancer grapsus. *Linn., Fabr.*

Grapsus pictus. *Latr.*

DIVISIO IV.

Abdomen in utroque sexu 7-articulatum. *Pedum* par anticum didactylum: par quintum saltem dorsale.

SUBDIVISIO 1.

Pedum par quintum dorsale. Oculi pedunculo biarticulato.

Gen. 20. HOMOLA.

Testa elongato-quadrata, fronte sub-producto. *Oculi* magni subglobosi, pedunculo elongato biarticulato, articulo secundo brevissimo primo abrupte crassiore. *Antennæ externæ* infra oculos insertæ, articulis duobus primis valde elongatis primo crassiore; *internæ* intra orbitas insertæ, et in oculorum cantho interno reponendæ. *Pedipalpi gemini externi* caule interno articulis duobus angustis, elongatis, articulo secundo ad apicem palpigero; *palpi* triarticulati utrinque hirsuti, articulo primo breviore. *Pedum* paria 2, 3 et 4 consimilia, unguibus compressis, acutis interne spinosis instructa; par quintum dorsale monodactylum ungue spinuloso breviore, tarso brevi interne spinuloso.

Spec. 1. *Homola spinifrons.*

H. testâ antice spinosâ, lateribus antice spinulosis, femoribus posticis interne trispinosis.

Habitat ——

Mus. Britann.

SUBDIVISIO 2.

Pedum paria 4 et 5 dorsalia. Oculi pedunculo simplici.

Gen. 21. DORIPPE.

Pedipalpi gemini externi articulo primo interno dilatato, articulo

secundo

secundo angusto et ad apicem palpigeri. *Testa* subtriangulari antice truncata. *Pedum* paria 2 et 3 consimilia, unguibus elongatis subquadratis, simplicibus acutis: paria 3 et 4 breviora, dorsalia, monodactyla. *Antennæ exteriores* supra et intra oculos insertæ, articulis duobus primis longioribus; *interiores* intra et infra oculos insertæ.

Spec. 1. *Dorippe quadridens, Latr.*

Gen. 22. DROMIA.

Pedipalpi gemini externi biarticulati articulo secundo sublatiore, breviore ad apicem internum palpigerum. *Pedum* paria 2 et 3 simplicia; 4 et 5 didactyla, breviora. *Antennæ exteriores* infra oculos insertæ; articulis duobus primis majoribus, reliquis abrupte crassioribus; *interiores* infra oculos internum versus insertæ.

DIVISIO V.*

Abdomen in utroque sexu 7-articulatum. *Pedum* par anticum didactylum; paria 2, 3, 4 et 5 simplicia, consimilia. *Testa* triangularis, antice rostrata. (Antennæ interiores in fossulis sub rostro reponendæ.)

SUBDIVISIO 1.

Digiti deflexi.

Gen. 23. EURYNOME.

CANCER, *Pennant.*

Antennæ externæ articulo primo secundo breviore. *Testa* verrucosa, rostro laciniis divaricatis. *Pedes* antici maris valde elongati.

Spec. 1. *Eurynome aspera.*

E. pedibus anticis femoribusque tuberculatis, testa dorso tuber-

* *I shall merely treat of the indigenous genera of this division.*

 culis

culis octo elevatioribus 2, 1, 2, 3 cum plurimis aliis irregularibus depressis pilis marginatis, lateribus utrinque lamellis quatuor, rostro laciniis simplicibus acuminatis.

Cancer asper. *Penn. Brit. Zool. vol.* iv.

Eurynome aspera. *Leach, Edin. Encycl.* vii. 431.

——, *Malac. Podophth. Brit. tab.* xvii.

SUBDIVISIO 2.

Digiti subrecti, haud deflexi.

* Antennæ externæ articulo primo secundo haud multo crassiore.

a. *Pedes antici aliis haud crassiores.*

Gen. 24. Maja, *Lam., Latr., Bosc.*

Cancer, *Oliv., Scop., Herbst, Sowerby.*

Antennæ articulis duobus primis crassioribus et longitudine subæqualibus. *Testa* convexa ovato-subtriangularis, spinosissima. *Oculi* pedunculo elongato haud crassiores. *Pedipalpi gemini externi* caulis interni articulo secundo ad apicem internum profunde emarginato. *Pedes* antici aliis haud aut vix crassiores: ungues omnes ad apicem nudi, acuti.

Spec. 1. *Maya Squinado.*

M. testâ fasciculato-pilosâ, orbitâ superne spinâ unicâ, lateribus valide 5-spinosis, clypeo infra frontem spinâ breviusculâ superne excavatâ.

Cancer Squinado. *Herbst, tom.* iii. *tab.* 56. senior.

——, *tom.* i. *tab.* 14. *f.* 85—84. junior.

Cancer Maja. *Scop.*

Sowerby, Brit. Miscell. tab. 39.

Maja

Maja Squinado. *Latr. Gen. Crust. et Ins.* i. *p.* 37.
Bosc, Hist. Nat. des Crust. i. 257.
Leach, Edin. Encycl. vii. 394—431.

Anglice, *King-crab, Thornback.*

Habitat in Mari Angliæ australi et occidentali vulgatissime.

b. *Pedes antici aliis distincte crassiores.*

Gen. 25. Pisa.

Cancer, *Herbst, Gmelin, Montagu.*
Inachus, *Fabr.*
Maja, *Latr.*
Pisa, *Leach.*
Blastus, *Leach.*

Testa villosa, rostro laciniis divaricatis. *Antennæ* pilis clavatis, articulo primo secundo longiore. *Oculi* pedunculo vix crassiores. *Pedipalpi gemini externi* caulis interni articulo secundo ad apicem internum truncato aut emarginato. *Ungues* interne denticulati, apice nudi.

† *Testa dense villosa, lateribus utrinque postice spinâ terminatis.*

Spec. 1. *Pisa Gibbsii.*

P. rostro descendente, testâ spinâ utrinque pone oculos, brachiis femoribusque simplicibus.

Cancer biaculeata. *Montagu, Linn. Trans.* xi. 2. *tab.* i. *fig.* 1.

Pisa biaculeata. *Leach, Edin. Encycl.* vii. 431.

Habitat in Danmoniæ mari profundo.

Detexit assiduus Dom. Gibbs, cujus nomen gerit.

Spec. 2.

Spec. 2. *Pisa nodipes.*

P. rostro horizontali, femorum apice brachiisque nodosis.
Pisa nodipes. *Leach, Zool. Miscel. vol.* ii. *tab.* 78.
Mus. Britan.
Habitat ——?

†† *Testa villosa lateribus spinosis.*

Spec. 3. *Pisa Tetraodon.*

P. testâ lateribus utrinque 6-spinosis: spinis duabus minoribus; quatuor majoribus.
Cancer tetraodon. *Penn. Brit. Zool.* iv. 7. *tab.* viii. *fig.* 15.
Cancer Prædo. *Herbst, tab.* xlii. *fig.* 2?
Maja tetraodon. *Bosc, Hist. Nat. des Crust.* i. 254.
Blastus tetraodon. *Leach, Edin. Encycl.* vii. 431.
Habitat in Angliæ australi-occidentalis mari.

Ad hanc sectionem forte pertinet Maja armata, *Latreille.*

** Antennæ externæ articulo primo externe dilatato.

Gen. 26. Hyas.

Cancer, *Herbst.*
Maja, *Bosc, Latr.*
Inachus, *Fabr.*

Testa elongato-subtriangularis, subtuberculata, lateribus pone oculos hastato-productis; rostro fisso laciniis approximatis. *Antennæ externæ* articulo primo dilatato secundo longiore. *Pedipalpi gemini externi* articulo secundo ad apicem internum emarginato.

Spec. 1. *Hyas araneus.*

H. testâ processu hastiformi postice tuberculato.
Cancer araneus. *Linn. Syst. Nat.* 1044.—*Fn. Sv.* 493. 2030.

Cancer

Cancer Bufo. *Herbst*, i. 242. *tab.* xvii. *fig.* 59.
Inachus araneus. *Fabr. Sup. Ent. Syst.* 356.
Hyas araneus. *Leach, Edin. Encycl.* vii. 431.
Habitat in mari Scotico vulgatissime, in mari Angliæ rarior.
Cancer araneus. *Penn. Brit. Zool.* iv. *tab.* ix. *fig.* 16. an distincta species?

Spec. 2. *Hyas coarctatus.*

H. testâ tuberculatâ lateribus coarctatis, processu hastiformi postice valde dilatato inermi.
Habitat in mari Britannico; apud Frith of Forth, Plymouth Sound et Salcombe.

DIVISIO VI.

Abdomen in utroque sexu 6-articulatum. *Pedes* duo antici didactyli; paria 2, 3, 4 et 5 consimilia, gracillima, simplicia. *Testa* triangularis antice rostrata. *Antennæ* internæ in fossulis sub clypeo receptæ.

SUBDIVISIO 1.

Oculi retractiles.

Gen. 27. INACHUS, *Fabr.*

CANCER, *Herbst, Penn.*
MAJA, *Bosc, Latr.*
Testa parce spinosa, spinâ utrinque ad latera oculos retractos protegente. *Oculi* distantes pedunculo vix crassiores. *Pedipalpi gemini externi* caulis interni articulo secundo ad apicem internum truncato. *Antennæ externæ* articulis tribus basilaribus crassioribus. *Pedum* par secundum sequentibus crassius. *Ungues* curvati.

Spec. 1. *Inachus Dorsettensis.*

I. rostro brevi emarginato, clypeo infra in spinam producto testâ

testâ antice tuberculis quatuor parvis æqualibus transversim dispositis: deinde spinis tribus (anticâ dorsali validiore); postea spinis tribus validis acutis (mediâ sæpius majore acutiore) lineam subrecurvam delinientibus, margine postico tuberculis duobus distantibus obsoletis.

Cancer Dorsettensis. *Penn. Brit. Zool.* iv. *p.* 8. *pl.* ix. A. *fig.* 18.
Cancer Scorpio. *Fabr. Sp. Ins.* i. 504.
Gmel Syst. Nat. i. 2978.
Herbst, i. 237, 130.
Inachus Scorpio. *Fabr. Ent. Syst. Suppl.* 358.
Macropus Scorpio. *Latr. Hist. Nat. des Crust. et des Ins.* vi. *p.* 109.
Maja Scorpio. *Bosc, Hist. Nat. des Crust.*
Inachus Dorsettensis. *Leach, Edin. Encycl.* vii. 431.
——, *Malac. Podophth. Brit. t.* xxii. *f.* 1—6.

Habitat in Britanniæ mari.

Spec. 2. *Inachus Dorynchus.*

I. rostro hastiformi fisso, testâ antice spinis tribus triangulum delinientibus: posticâ majore; deinde tuberculo utrinque; postea tuberculis quinque tribus mediis approximatis obtusioribus in triangulum dispositis pone lateralia et cum illis lineam retrorsum arcuatam delinientibus, margine postico tuberculis duobus distantibus obsoletis.

Cancer Phalangium. *Fabr. Ent. Syst.* ii. 463. 84?
Inachus Dorynchus. *Leach, Edin. Encycl.* vii. 431.
——, *Malac. Podophth. Brit. t.* xxii. *f.* 7, 8.

SUBDIVISIO 2.

Oculi haud retractiles.

Gen. 28.

Gen. 28. MACROPODIA.

MACROPUS, *Latr.*
INACHUS, *Fabr.*
MAJA, *Bosc.*
CANCER, *Penn.*, *Herbst.*

Testa parce spinosa, rostro longo fisso. *Oculi* distantes subreniformes pedunculo multo crassiores. *Antennæ externæ* corporis dimidio longiores, articulo secundo primo triplo longiore. *Pedipalpi gemini externi* tenues, caule interno biarticulato, articulis longitudine subæqualibus. *Palpi* hirsutissimi, articulo medio breviore, tertio primo paululum longiore. *Ungues* 4 antici ad apicem arcuati, 4 postici ad basin abrupte curvati.

Spec. 1. *Macropodia Phalangium.*

M. rostro acuminato antennis multo breviore, testâ pone rostrum tuberculis duobus triangulum delinientibus: postico majore, brachiis interne subscabrosis hirsutis.

Cancer phalangium. *Penn. Brit. Zool.* iv.
Macropus longirostris. *Latr. Gen. Crust. et Ins.* i. 39.
Macropodia longirostris. *Leach, Edin. Encycl.* vii. 395.
——, *Zool. Miscell.* ii. 18.

Habitat in estuariis Britanniæ vulgatissime.

Spec. 2. *Macropodia tenuirostris.*

M. rostro longissimo tenui, antennis rostro vix longioribus, testâ pone rostrum tuberculis duobus spinâque unicâ in triangulum dispositis, brachiis interne spinulosis.

Habitat in Angliæ occidentalis mari profundo vulgatissime.

Gen. 29. LEPTOPODIA.

INACHUS, *Fabr.*
MAJA, *Latr.*, *Bosc.*
CANCER, *Herbst.*

 Testa

Testa haud spinosa, rostro longissimo integro. *Oculi* distantes globosi. *Antennæ externæ* corporis dimidio longiores, articulo secundo primo triplo longiore. *Pedipalpi gemini externi* tenues, caule interno biarticulato, articulo secundo primi dimidio breviore. *Palpi* hirsuti, articulo ultimo longiore, articulis duobus primis subæqualibus. *Ungues* longiores, subarcuati, consimiles.

Spec. 1. *Leptopodia sagittaria.*

L. manibus granulosis, rostro utrinque brachiis femoribusque antice spinosis.

Inachus sagittarius. *Fabr. Supp. Ent. Syst.* 359.
Cancer sagittarius. *Herbst, tom.* iii.
Macropus sagittarius. *Latr. Hist. Nat. des Crust. et des Ins.* vi. 112.
Maja sagittaria. *Latr. Gen. Crust. et Ins.* i. 38. 4.
Leach, Edin. Encycl. vii. 395.
Maja sagittis. *Bosc, Hist. Nat. des Crust.* i. 253.
Leptopodia sagittaria. *Leach, Zool. Miscel.* ii. 16. *tab.* 67.
Habitat in mari Caribæo.

DIVISIO VII.

Abdomen (in utroque sexu?) 6-articulatum. *Pedum* paria 2, 3 et 4 consimilia, simplicia, par quintum minutum spurium. *Testa* triangularis antice rostrata.

Gen. 30. LITHODES, *Latr.*

MAJA, *Bosc.*
INACHUS, *Fabr.*
CANCER, *Linn.*

Spec. 1. *Lithodes Maja.*

Cancer Maja. *Linn. Syst. Nat.* i. 1046. 41.
Cancer horridus. *Pennant, Brit. Zool.*
Lithodes arctica. *Latr. Gen. Crust. et Ins.* i. 40.

DIVISIO

DIVISIO VIII.

Abdomen (in utroque sexu?) 5-articulatum. *Testa* triangularis antice rostrata.

Gen. 31. PACTOLUS, *Leach.*

INACHUS, *Fabr.?*

Testa haud spinosa, rostro longissimo integro. *Pedes* mediocres; *paria* 1, 2 (et 3?) ungue simplici instructa, paria 4 et 5 didactyla. (*Abdomen* FŒMINÆ 5-articulatum, articulo primo angusto, 2, 3 et 4 transverso-linearibus, 5 amplissimo, subrotundato.)

Spec. 1. *Pactolus Boscii.*

P. rostro utrinque spinuloso, pedibus ciliato-punctatis.

Habitat ——— ?

Mus. Britann.

An sit *Fabricii* Inachi sagittarii sexus alter?

DIVISIO IX.

Abdomen in utroque sexu quadriarticulatum. *Antennæ* externæ minutissimæ. *Pedipalpi gemini externi* caule interno acuminato.

Gen. 32. LEUCOSIA*.

LEUCOSIA, *Fabr.*, *Latr.*, *Bosc.*

CANCER, *Linn.*, *Herbst*, *Mont.*

Testa rotundata aut rhomboidalis antice subproducta. *Pedipalpi gemini externi* caulis interni articulo secundo simplici. *Pedum* par anticum aliis distincte crassius.

Obs. Hoc genus elaborandum.

* *Ad hoc genus pertinent species indigenæ* Cancer tuberosus, *Penn. Brit. Zool. vol.* iv. *et* Cancer tumefactus, *Montagu, Trans. Linn. Soc. vol.* ix.

* *Pedipalpi gemini externi caulis externi articulo secundo externe dilatato.*

Spec. 1. *Leucosia anatum.*

Cancer anatum. *Herbst*, i. 93. *tab.* ii. *fig.* 19.

** *Pedipalpi gemini externi caulis externi articulo secundo sublineari.*

Spec. 2. *Leucosia craniolaris.*

Cancer craniolaris. *Herbst*, i. 90. *tab.* ii. *fig.* 17.

Gen. 33. Ixa.

Cancer, *Herbst.*
Leucosia, *Latreille.*

Testa transversissima, subcylindrica, multo latior quam longa. *Pedipalpi gemini externi* caulis interni articulo secundo excavato. *Pedum* par anticum aliis vix crassius.

Spec. 1. *Ixa cylindrus.*

I. testâ bicanaliculatâ lateribus scabris spinâ terminatâ.
Leucosia cylindrus. *Latr. Hist. Nat. des Crust. et des Ins.* vi. 119.
Cancer cylindricus. *Herbst*, i. 108. *tab.* ii. *fig.* 29. 30. 31. ♂.
Habitat in mari Indico.

Ordo II.

Ordo II. MACROURA.

This order contains the families *Pagurii*, *Palinurini*, *Astacini*, and *Squillares* of Latreille.

SYNOPSIS GENERUM.

A. *Cauda utrinque appendiculis simplicibus nec natatoriis nec foliaceis.*

DIVISIO I. Pedes 10, pari antico majore didactylo.	*Genera.*
Abdomen membranaceum; cauda triarticulata.	1. PAGURUS.
Abdomen crustaceum; cauda biarticulata.	2. BIRGUS.

B. *Cauda utrinque appendicibus foliaceis, pinnam flabelliformem efformantibus.*

a. *Antennæ interiores pedunculis longissimis.*

DIVISIO II. Antennæ exteriores squamiformes. Pedes 10 consimiles, simplices.	
Pedes postici tarso infra in indicem producto. Oculi pone antennas exteriores inserti, haud marginales.	3. SCYLLARUS.
Pedes postici tarso simplici. Oculi ad thoracis angulos anticos inserti.	4. THENUS.
DIVISIO III. Antennæ exteriores setaceæ, longissimæ. Pedes 10 consimiles, simplices.	5. PALINURUS.
DIVISIO IV. Antennæ exteriores setaceæ longissimæ. Pedes 10, pari antico didactylo, pari quinto spurio.	
Pedipalpi gemini externi caulis interni articulo primo interne dilatato. Testa orbiculato-quadrata.	6. PORCELLANA.
Pedipalpi gemini externi caulis interni articulo primo simplici. Testa ovata.	7. GALATHEA.

b. *Antennæ interiores pedunculis mediocribus.*

DIVISIO V. Cauda lamellâ exteriore simplici. Antennæ in eadem lineâ horizontali insertæ, interiores setis duabus, exteriores simplices. Pedes 10.	
Pedes duo antici didactyli pollice abbreviato.	8. GEBIA.
Pedes quatuor antici didactyli, pari tertio monodactylo.	9. CALLIANASSA.
Pedes quatuor antici didactyli, pari tertio simplici.	10. AXIUS.

DIVISIO VI. Cauda lamellâ exteriore bipartitâ. Antennæ in eadem lineâ horizontali insertæ, interiores setis duabus, exteriores pe-

dunculi

dunculi articulo primo squamâ spiniformi instructo. Pedes 10, pari antico majore didactylo.

Oculi subglobosi pedunculo haud crassiores. 11. ASTACUS.

Oculi reniformes pedunculo multo et abrupte crassiores. 12. NEPHROPS.

DIVISIO VII. Antennæ exteriores squamâ magnâ, latâ ad basin. Abdomen articulo secundo antice et postice producto. Pedes decem.

Subdivisio 1. Antennæ exteriores infra interiores insertæ; interiores setis duabus; cauda lamellâ exteriore bipartitâ.

Pedes quatuor antici articulo ultimo fisso; par tertium majus, inæquale, adactylum. 13. ATYS.

Subdivisio 2. Antennæ in eadem fere lineâ horizontali insertæ, interiores setis duabus. Cauda lamellâ exteriore unipartitâ.

Pedes duo antici majores, monodactyli. 14. CRANGON.

Subdivisio 3. Antennæ exteriores infra exteriores insertæ; interiores setis duabus. Cauda lamellâ exteriore unipartitâ.

* *Antennæ internæ setâ superiore infra excavatâ. Ungues spinulosi.*

Pedum par anticum adactylum, par secundum inæquale didactylum. 15. PANDALUS.

Pedes quatuor antici didactyli. Palpi pediformes articulo ultimo penultimo multo breviore. 16. HIPPOLYTE.

Pedes quatuor antici didactyli. Palpi pediformes articulo ultimo penultimo triplo longiore. 17. ALPHÆUS.

** *Antennæ internæ setâ superiore haud excavatâ. Ungues edentuli.*

Pedes sex antici didactyli. 18. PÆNEUS.

Subdivisio 4. Antennæ exteriores infra interiores insertæ; interiores setis tribus. *Cauda* lamellâ exteriore unipartitâ.

Pedes quatuor antici didactyli pari antico minore. 19. PALÆMON.

Pedes quatuor antici didactyli pari antico majore. 20. ATHANAS.

DIVISIO VIII. Antennæ exteriores infra interiores insertæ squamâ magnâ ad basin. Pedes sexdecim.

Pedes bifidi, pari antico laciniâ interiore articulo ultimo compresso uniarticulato. 21. MYSIS.

C. *Cauda setis duabus terminata.*

DIVISIO IX. Pedes duodecim. Antennæ duæ apice bifidæ.

Thorax antice rostro mobili instructus. Pedum par anticum longius, simplex; aliis remotioribus æqualibus articulo ultimo bifido. 22. NEBALIA.

OBS. SQUILLA, *Fabr.*, *Latr.*, *&c.* genus incertæ sedis.

Ordo II.

Ordo II. MACROURA.

DIVISIO I.

Cauda utrinque appendiculata, appendiculis nec foliaceis nec natatoriis. *Pedes* 10, par anticum majus didactylum; paria 2 et 3 ungue valido instructa.

Gen. 1. PAGURUS, *Fabr., Latr., &c.*

GANCER, *Linn., Gmel.*

ASTACUS, *Penn.*

Antennæ articulo secundo ad apicem supra spinâ mobili instructo. *Abdomen* membranaceum. *Cauda* triarticulata crustacea, articulo secundo utrinque appendiculato. *Pedes* quatuor postici spurii, breves, didactyli.

Spec. 1. *Pagurus Bernhardus.*

Pagurus Bernhardus *auctorum.*

Gen. 2. BIRGUS.

PAGURUS, *Fabr.*

CANCER, *Linn.*

Antennæ articulo secundo cristato. *Abdomen* crustaceum. *Cauda* biarticulata crustacea, articulo primo utrinque appendiculato. *Pedum* par quartum didactylum; par quintum (didactylum?).

Spec. 1. *Birgus Latro.*

B. testâ antice rostro acuminato simplici.

Cancer Latro. *Linn. Syst. Nat.* 1049.

Cancer (*astacus*) Latro. *Herbst*, ii. 34. *tab.* xxiv.

Pagurus Latro. *Latr. Gen. Crust. et Ins.* i. 46.

DIVISIO

DIVISIO II.

Cauda utrinque lamellis duabus foliaceis pinnam flabelliformem efformantibus. *Oculi* distantes. *Antennæ interiores* pedunculis longissimis; *exteriores* squamiformes. *Pedes* decem consimiles ungue simplici instructi.

Gen. 3. SCYLLARUS, *Fabr., Latr., &c.*

CANCER, *Linn.*

Pedes postici tarso infra in pollicem producto. *Thorax* convexus, sublinearis. *Oculi* pone antennas exteriores inserti.

Spec. 1. *Scyllarus arctus.*

Cancer arctus. *Linn. Syst. Nat.* 1053.
Scyllarus arctus. *Latr. Gen. Crust. et Ins.* i. 47.

Gen. 4. THENUS.

Pedes postici tarsis aliis consimilibus. *Thorax* subdepressus antice latior. *Oculi* ad thoracis angulos anticos inserti.

Spec. 1. *Thenus Indicus.*

T. antennis serratis, thorace granulato carinato trispinoso, abdomine granulato: granulis transversim digestis.
Habitat in mari Indico.

DIVISIO III.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus. *Oculi* basi approximati. *Antennæ interiores* pedunculis longissimis; *exteriores* setaceæ, longissimæ. *Pedes* decem consimiles, ungue simplici instructi.

Gen. 5. PALINURUS, *Dald., Fabr., &c.*

CANCER, *Linn.*

ASTACUS, *Pennant.*

Spec. 1. *Palinurus Homarus.*

Astacus homarus. *Pennant, Brit. Zool.* iv.

DIVISIO IV.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus. *Antennæ interiores* pedunculo longissimo; *exteriores* longissimæ, setaceæ. *Pedes* decem; par anticum majus didactylum: par quintum spurium.

Gen. 6. PORCELLANA, *Lam., Latr., Bosc, &c.*

CANCER, *Linn.*

Pedipalpi gemini externi caulis interni articulo primo interne dilatato. *Testa* orbiculato-subquadrata.

Spec. 1. *Porcellana platycheles.*

Cancer platycheles. *Pennant, Brit. Zool.* iv. 6. *pl.* 6. *and* 12.

Porcellana platycheles. *Latr. Gen. Crust. et Ins.* i. 49.

Gen. 7. GALATHEA, *Fabr., Latr., &c.*

CANCER, *Linn.*

ASTACUS, *Pennant.*

Pedipalpi gemini externi caulis interni articulo primo interne haud dilatato. *Testa* ovata.

* *Rostrum acuminatum, acutum, utrinque 4-spinosum. Pedes antici compressi. Abdomen segmentis lateraliter obtusis. Cauda lamellâ intermediâ triangulari apice emarginata laciniis apice rotundatis. Antennæ interiores pedunculi articulo primo trispinoso.*

a. Pedipalpi gemini externi caulis interni articulo secundo primo longiore.

Spec. 1. *Galathea squamifera.*

G. pedibus anticis granulato-squamosis, manibus externe carpis brachiisque interne spinosis.
Cancer (*astacus*) squamifer. *Montagu, Mss.*
Galathea squamifera. *Leach, Edin. Encycl.* vii. 398.
——, *Malac. Podophth. Brit. tab.* xxviii. A.
Habitat in Angliæ occidentalis mari vulgatissime.

Spec. 2. *Galathea Fabricii.*

G. pedibus anticis granulato-squamosis, manibus externe subserratis, carpis brachiisque internis spinosis.
Habitat ———
Mus. Brit.

The fingers of the fore-feet are more bent than in *Galathea squamifera.*

b. Pedipalpi gemini externi caulis interni articulo primo secundo longiore.

Spec. 3. *Galathea spinigera.*

G. pedibus anticis subgranulato-squamosis supra et utrinque spinosis, brachiis externe inermibus.
Astacus strigosus†. *Penn. Brit. Zool.* iv. 18. *pl.* 14.
Herbst, tab. xxvi. *fig.* 2.

† *Alia et distincta species est Cancer strigosus Linnæi, ut hæc indicant verba.* "Thorax obovatus margine utrinque spinis octo acuminatis antrorsum porrectis ciliatis, dorso rugis numerosis antrorsum imbricatis. Chelæ oblongæ, depressæ, margine aculeatæ, supra scabræ, subtus quasi squamosæ; pedes apice rubri."—*Fn. Sv.* 2036. "Brachia introrsum aculeata; chelæ oblongæ, margine aculeatæ, latere superiore antrorsum imbricatæ scabritie ciliari."—*Syst. Nat.* 1053.

Galathea

Galathea strigosa. *Fabr. Ent. Syst.* ii. 471.—*Suppl.* 414.
Latr. Gen. Crust. et Ins. i. 49.
Leach, Edin. Encycl. vii. 398.
——, *Malac. Podophth. Brit. t.* xxviii. B.
Habitat in mari Europæo vulgate.

** *Rostrum elongatum spiniforme, basi utrinque bispinoso. Pedes antici subcylindrici. Abdomen segmentis lateraliter acutis. Cauda lamellâ intermediâ transverso-quadratâ apice subemarginatâ. Antennæ interiores pedunculi articulo primo 4-spinoso. (Pedipalpi gemini externi caulis interni articulo primo secundo longiore.)*

Spec. 4. *Galathea rugosa.*

G. pedibus anticis introrsum præsertim spinosis, abdomine segmento secundo antice 6- tertio 4-spinosis.
Astacus Bamffius. *Penn. Brit. Zool.* iv. *t.* 27.
Galathea rugosa. *Fabr. Supp. Ent. Syst.* 415.
Bosc, Hist. Nat. des Crust.
Latr. Hist. Nat. des Crust. et des Ins. vi. 199. 2.
Cancer rugosus. *Gmel. Syst. Nat.*
Galathea longipeda. *Lam. Syst. des Anim. sans Vert.* 158.
Galathea Bamfia. *Leach, Edin. Encycl.* vii. 398.
Galathea rugosa. *Leach, Malac. Britan. tab.* xxix.
Habitat in maribus Europæo et Mediterraneo.

DIVISIO V.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus, lamellâ exteriore simplici. *Antennæ* in eâdem fere lineâ horizontali insertæ; *interiores* setis duabus; *exteriores* simplices. *Pedes* decem.

Animalia subterranea, pedibus variis sæpissime spuriis, compressis.

 Gen. 8.

Gen. 8. GEBIA.

CANCER (Astacus), *Montagu.*

Pedes duo antici æquales, subdidactyli, pollice abbreviato. *Antennæ interiores* pedunculo elongato: articulis secundo breviore, tertio longiore cylindrico. *Pedipalpi gemini externi* caulis interni articulo tertio breviore. *Cauda* lamellis latis, exterioribus costatis, medio quadrata.

Spec. 1. *Gebia stellata.*

G. abdomine toto crustaceo, cauda lamellâ exteriore rotundatâ interiore subacuminatâ.

Cancer *astacus* stellatus. *Montagu, Trans. Linn. Soc.* ix.

Gebia stellata. *Leach, Edin. Encycl.* vii. 400.

Habitat in Danmoniâ australi sub arenâ ad littora maris.

Spec. 2. *Gebia Deltaura.*

G. abdomine dorso membranaceo, cauda lamellâ exteriore apice subrotundatâ dilatatâ: interiore truncatâ deltoideâ.

Habitat cum præcedente. Observavit J. Sowerby jun.

Gen. 9. CALLIANASSA.

CANCER (Astacus), *Montagu.*

Pedes quatuor antici didactyli; *par anticum* majus valde inæquale; *par secundum* minus; *par tertium* monodactylum; *paria quartum* et *quintum* spuria. *Antennæ interiores* pedunculo elongato, biarticulato, articulo secundo longiore. *Pedipalpi gemini externi* caulis interni articulo secundo compresso longiore. *Cauda* lamellis latis, medio elongato-triangulari apice rotundata.

OBS. *Thorax* antice abrupte subacuminatus processu rostriformi suturâ distincto. *Pedum* par anticum valde compressum manu articulatâ, pede majore carpo processu curvato ad basin.

Spec. 1.

Spec. 1. *Callianassa subterranea.*

C. processu rostriformi unicarinato apice rotundato.
Cancer (astacus) subterraneus. *Montagu, Linn. Trans.* ix.
Callianassa subterranea. *Leach, Edin. Encycl.* vii. 400.
Habitat sub arenâ ad littora maris ; in Danmoniâ australi haud valde infrequens.

Gen. 10. AXIUS.

Pedes quatuor antici didactyli ; *par anticum* majus subinæquale ; *paria* 3, 4 et 5 compressa, ungue compresso instructa. *Antennæ interiores* pedunculo triarticulato, articulo primo longiore. *Pedipalpi gemini externi* articulis duobus primis sublongioribus, æqualibus. *Cauda* lata, lamellâ intermediâ elongato-triangulari.

Spec. 1. *Axius Stirynchus.*

A. rostro marginato medio carinato, thorace pone rostrum lineis duabus elevatis abbreviatis posticè emarginato.
Habitat in Danmoniæ mari rariùs ; apud Sidmouth et prope Plymouth bis obvius.

DIVISIO VI.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus, lamellâ exteriore bipartitâ. *Antennæ* in eâdem fere lineâ horizontali insertæ ; *interiores* setis duabus ; *exteriores* pedunculo articulo primo ad apicem squamâ acutâ instructo. *Pedes* decem, par anticum in omnibus majus, inæquale, didactylum.

Gen. 11. ASTACUS, *Fabr., &c.*

Oculi subglobosi pedunculo haud crassiores. *Antennæ exteriores* pedunculi articulo primo squamâ spiniformi ad pedunculi apicem haud attingente. *Pedum coxæ* paris tertii FŒMINÆ, MARIS quinti paris perforatæ.

* *Abdomine*

* *Abdomine segmentorum lateribus obtusis.*

Spec. 1. *Astacus Gammarus.*

Cancer Gammarus. *Linn. Syst. Nat.* i. 1050.
Astacus Gammarus. *Penn. Brit. Zool.* iv.
Astacus marinus. *Fabr. Suppl. Ent. Syst.* 406.
Latr. Gen. Crust. et Ins. i. 51.

** *Abdomine segmentorum lateribus acutis.*

Spec. 2. *Astacus fluviatilis.*

Cancer astacus. *Linn. Syst. Nat.* i. 1051.
Astacus astacus. *Penn. Brit. Zool.* iv.
Astacus fluviatilis. *Fabr. Suppl. Ent. Syst.* 406.
Latr. Gen. Crust. et Ins. i. 51.

Gen. 12. Nephrops.

Astacus, *Fabr.*, *&c.*

Oculi reniformes, pedunculo abrupte et multo crassiores. *Antennæ exteriores* pedunculi articulo primo squamâ ultra pedunculi apicem prodeunte. *Pedum coxæ* FŒMINÆ paris tertii, MARIS paris quinti perforatæ.

Spec. 1. *Nephrops Norvegicus.*

Cancer Norwegicus. *Linn. Syst. Nat.* i. 1053.
Astacus Norwegicus. *Penn. Brit. Zool.* iv.
Nephrops Norvegicus. *Leach, Edin. Encycl.* vii.

DIVISIO VII.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus. *Antennæ exteriores* squamâ magnâ ad basin. *Abdomen* articulo secundo infernè anticè et posticè producto. *Pedes* decem.

SUBDIVISIO

SUBDIVISIO 1.

Antennæ exteriores infra inferiores insertæ; *interiores* setis 2 in eâdem lineâ horizontali insertæ. *Cauda* lamellâ exteriore bipartitâ.

Gen. 13. Atys.

Pedes quatuor antici æquales, articulo ultimo fisso; *par tertium* majus, inæquale, adactylum, ungue simplici instructum; *paria* 4 et 5 simplicia, ungue simplici terminata. *Cauda* lata, lamellâ intermediâ apice subacuminatâ, rotundatâ.

Spec. 1. *Atys scaber.*

A. rostro carinato trifido: dente medio longiore, pedibus sex posticis scabris.

Habitat ———

Mus. Britann.

Obs. Pedes quatuor antici articulo fisso pilosissimo.

SUBDIVISIO 2.

Antennæ in eâdem fere lineâ horizontali insertæ: *interiores* setis duabus in eâdem lineâ horizontali. *Cauda* lamellâ exteriore unipartitâ.

Gen. 14. Crangon, *Fabr.*, *Latr.*, *&c.*

Astacus, *Penn.*

Cancer, *Linn.*

Pedum par anticum majus, manu compressâ monodactylâ, aut indice spurio instructâ, paria 2 et 3 tenuiora, alia simplicia, ungue terminata; paria 4 et 5 subrobustiora.

Spec. 1. *Crangon vulgaris.*

C. thorace pone rostrum et utrinque unispinoso.

Cancer

Cancer crangon. *Linn. Syst. Nat.* i. 1052.
Astacus crangon. *Pennant, Brit. Zool.* iv.
Crangon vulgaris. *Fabr., Latr., Bosc.*
Leach, Edin. Encycl. pl. 221. *fig.* 5.
Habitat in Oceano Europæo vulgaris.

Spec. 2. *Crangon spinosus.*

C. thorace tricarinato: carinis trispinosis.
Habitat in Danmoniæ australi mari. Apud Plymouth Sound semel observavit Dom. C. Prideaux.
Mus. Nostr.

SUBDIVISIO 3.

Antennæ exteriores infra inferiores insertæ ; *interiores* setis duabus unâ super aliam insertâ. *Cauda* lamellâ exteriore unipartitâ.

* *Palpi pediformes apice spinulosi. Abdomen segmento tertio supra gibboso producto. Antennæ interiores setâ superiore infra excavatâ. Ungues spinulosi.*

Gen. 15. Pandalus.

Pedum par anticum adactylum ; par secundum didactylum, inæquale. *Palpi pediformes* articulo ultimo penultimo longiore.

Spec. 1. *Pandalus annulicornis.*

P. rostro multidentato ascendente apice emarginato, antennis inferis rubro annulatis internè spinulosis.
Pandalus annulicornis. *Leach, Malac. Podophth. Brit. tab.* xl.
Habitat in mari Britannico. Detexit D. J. Fleming.

Gen. 16. Hyppolyte.

Pedes quatuor antici didactyli. *Palpi pediformes* articulo ultimo penultimo multo breviore.

Spec. 1.

Spec. 1. *Hippolyte varians.*

H. rostro recto superne ac inferne biserrato, testâ supra et infra oculos unispinosâ.

Habitat in Danmoniæ australis mari.

Spec. 2. *Hippolyte inermis.*

H. rostro inermi basi utrinque unispinoso.

Habitat cum præcedente. Communicaverunt Dom. C. Prideaux et J. Cranch cum copiâ specierum ineditarum; cujus characteres nondum accuratissime elaboravi.

Gen. 17. ALPHEUS, *Fabr., Latr.*

Pedes quatuor antici didactyli. *Palpi pediformes* articulo ultimo penultimo triplo longiore.

Spec. 1. *Alpheus Spinus.*

Cancer Spinus. *Sowerby, Brit. Miscel.*

Habitat in mari Scotico.

** *Palpi pediformes apice inermes. Abdomen segmento tertio haud gibboso-producto. Antennæ interiores setâ superiore haud excavatâ. Ungues edentuli.*

Gen. 18. PENÆUS, *Fabr., Latr.*

Palpi pediformes articulis quinque exsertis, articulo ultimo obtusiusculo. *Pedes* sex antici didactyli.

Spec. 1. *Penæus trisulcatus.*

P. thorace postice trisulcato, rostro descendente supra multidentato.

Habitat in Cambriæ mari.

Mus. Sowerby, Nostr.

SUBDIVISIO 4.

Antennæ exteriores infra interiores insertæ ; *interiores* setis tribus. *Cauda* lamellâ exteriore unipartitâ.

Gen. 19. Palæmon, *Fabr., Latr., &c.*

Astacus, *Penn.*
Cancer, *Linn.*
Pedes quatuor antici didactyli, pari antico minore. *Palpi* pediformes articulo ultimo penultimo breviore.

Spec. 1. *Palæmon serratus.*

P. rostro ascendente supra 6- 7- aut 8-dentato apice emarginato ; infra 4- 5- vel 6-dentato.
Astacus serratus. *Penn. Brit. Zool.* iv. 19. *pl.* 16. *fig.* 28.
Palæmon Squilla. *Latr. Gen. Crust. et Insect.* i. 54.
Habitat in Mari Britannico.

Spec. 2. *Palæmon Squilla.*

P. rostro recto apice emarginato supra 7- aut 8- infra 2- vel 3-dentato.
Cancer Squilla. *Linn. Syst. Nat.* i. 1051.
Habitat cum præcedente in Danmoniâ australi vulgate.

Linnæus, in the second edition of *Fauna Suecica,* thus describes the above species: "Thorace lævi rostro supra serrato ; subtus 3-dentato, manuum digitis æqualibus."—" Rostrum lanceolatum perpendiculare, acutum, supra octo-crenis, infra tribus serratum ; manus, quæ tertio pedum pari insident, digitis sunt æqualibus." In the last edition of *Systema Naturæ* this character is again repeated ; and as it applies exactly to the most frequent variety of this species, there cannot be the least doubt as to the correct-

ness

ness of the quotation. I may observe (although I scarcely conceive it to be necessary) that when Linnæus made use of the term "the fingers of the third pair of feet" in the above character, he included the pediform palpi as a pair of feet. Unless the language be familiar to the reader, he might conceive that the Linnean species was not even referable to this genus, as the two interior pair of feet only have fingers.

Spec. 3. *Palæmon varians.*

P. rostro recto supra 4- 5- aut 6-dentato apice integro; infra bidentato.

Habitat in Danmoniæ, Norfolciæ mari vulgatissime.

An sit Astacus Squilla *Pennant?*

Gen. 20. Athanas.

Pedes quatuor antici didactyli, pari antico majore. *Palpi pediformes* articulo ultimo penultimo longiore.

Spec. 1. *Athanas nitescens.*

A. rostro recto inermi.

Cancer (*astacus*) nitescens. *Montagu, Mss.*

Habitat in Danmoniæ australis mari.

DIVISIO VIII.

Cauda utrinque lamellis duabus foliaceis flabellum efformantibus. *Antennæ* exteriores squamâ magnâ ad basin. *Pedes* sexdecim.

Gen. 21. Mysis, *Latr., Leach.*

Cancer, *Oth. Fabr.*

Praunus, *Leach.*

Pedes bifidi parium 4 anticorum articulo ultimo laciniâ interiore uniarticulato, ovato, compresso, pedum aliorum multiarticulato.

lato. *Palpi pediformes* 3-articulati, articulo medio longiore, primo brevissimo.

Ad fœminæ abdominis basin est uterus externus e membranis duobus concavis valvuliformibus efformatus, quo pulli nuper ex ovo exclusi vivunt, crescunt.

* *Cauda lamellâ intermediâ emarginatâ.*

Spec. 1. *Mysis spinulosus.*

M. caudâ lamellâ intermediâ externe spinulosâ apice acutè emarginatâ: lamellis exterioribus acuminatis latissime ciliatis.
Praunus flexuosus. *Leach, Edin. Encycl.* vii. 401.
Habitat in mari Scotico apud the Frith of Forth.

Spec. 2. *Mysis Fabricii.*

M. caudâ lamellâ intermediâ apice obtusè emarginatâ: lamellis exterioribus apice rotundatis.
Habitat in mari Grœnlandico.

** *Cauda lamellâ intermediâ integrâ.*

Spec. 3. *Mysis integer.*

Praunus integer. *Leach, Edin. Encycl.* vii. 401.
Habitat apud Loch Ranza in Arran insulâ, frequentissime.

Length one-third of an inch. Colour pellucid cinereous spotted with black and reddish-brown. Eyes black. Females more abundant than the males.

At low tide near Loch Ranza the pools were full of this species, swimming with its head uppermost and its eyes spread; making a most grotesque appearance.

Divisio

DIVISIO IX.

Cauda setis duabus terminata. *Pedes* duodecim.

Gen. 22. NEBALIA.

MYSIS, *Latr.*
CANCER, *Oth. Fabr., Herbst.*
MONOCULUS, *Montagu.*
Thorax antice rostro mobili instructus. *Pedum* par anticum longius, simplex; paria alia æqualia, approximata, articulo ultimo bifido. *Antennæ* duæ supra oculos insertæ, articulo ultimo bifido, multiarticulato.

Spec. 1. *Nebalia Herbstii.*

N. grisea aut cinereo-flavicans, oculis nigris.
Cancer bipes. *Oth. Fabr. Græn. no.* 223. *fig.* 2.
Herbst, ii. *tab.* xxiv. *fig.* 7.
Monoculus rostratus. *Mont. Trans. Linn. Soc.* ii. 14. *tab.* ii. *f.* 5.
Nebalia Herbstii. *Leach, Zool. Miscel.* 1. 100. *tab.* 44.
Habitat in oceano Europæo.

Legio II.

Legio II. EDRIOPHTHALMA.

Latreille considered the animals which compose the first and part of the second section of this Legion as a family of the MACROURA; but had he been acquainted with the following new and curious genera, he would doubtless have formed a very different opinion.

	Genera.
SECTIO I. *Corpus lateraliter compressum. Pedes* 14. *Antennæ* 2 *in frontem insertæ, unâ utrinque.* (*Cauda stylis instructa.*)	1. PHRONYMA.
SECTIO II. *Corpus lateraliter compressum. Pedes* 14 *coxis lamelliformibus. Antennæ* 4 *per paria insertæ.* (*Cauda stylis instructa.*)	
DIVISIO I. Antennæ 4-articulatæ, articulo ultimo e segmentis plurimis efformato; superiores brevissimæ.	
Antennæ superiores articulis duobus inferiorum basilaribus breviores.	2. TALITRUS.
Antennæ superiores articulis duobus basilaribus inferiorum haud longiores.	3. ORCHESTIA.
DIVISIO II. Antennæ 4-articulatæ, articulo ultimo e segmentis plurimis efformato; superiores subbreviores.	
Pedes 4 antici monodactyli, manu parvulâ compressâ.	4. ATYLUS.
DIVISIO III. Antennæ 3-articulatæ, articulo ultimo e segmentis plurimis efformato; superiores longiores.	
Pedes 4 antici subæquales monodactyli, manu compressâ.	5. DEXAMINE.
Pedum par anticum didactylum pollice biarticulato, par secundum monodactylum.	6. LEUCOTHÖE.
DIVISIO IV. Antennæ 4-articulatæ, articulo ultimo e segmentis plurimis efformato; superiores longiores.	
Subdivisio 1. Pedes quatuor antici monodactyli, par secundum manu valdè dilatatâ, compressâ.	
Pedum par secundum digito in palmam inflectendo.	7. MELITA.
Pedum par secundum digito in latus anticum inflectendum.	8. MÆRA.
Subdivisio 2. Pedum paria duo antica monodactyla conformia.	
Antennæ superiores ad basin articuli quarti setulâ instructæ.	9. GAMMARUS.

Antennæ

	Genera.
Antennæ superiores simplices. Manus ovatæ.	10. AMPITHÖE.
Antennæ superiores simplices. Manus filiformes.	11. PHERUSA.
DIVISIO V. Antennæ 4-articulatæ, inferiores longiores, pediformes. (Pedes quatuor antici monodactyli.)	
Subdivisio 1. Pedum par secundum manu magnâ.	
Oculi prominuli.	12. PODOCERUS.
Oculi haud prominuli.	13. JASSA.
Subdivisio 2. Pedum par secundum manu haud magnâ.	
(Oculi haud prominentes. Antennæ inferiores maximæ.)	14. COROPHIUM.
SECTIO III. *Corpus depressum. Antennæ* 4. *Pedes* 14.	
A. *Cauda inermis.*	
DIVISIO I. Corpus segmentis omnibus pedigeris.	
Subdivisio 1. Corpus lineare.	
Pedes omnes validi unguiculati, paria 3 et 4 basi appendiculata.	15. PROTO.
Pedum paria 3 et 4 spuria.	16. CAPRELLA.
Subdivisio 2. Corpus latum.	17. LARUNDA.
DIVISIO II. Corpus segmentis omnibus haud pedigeris.	
Antennæ exteriores articulis tertio quartoque æqualibus. Corpus ovatum.	18. IDOTEA.
Antennæ exteriores articulo tertio quarto longiore.	19. STENOSOMA.
B. *Cauda lamellâ* 1 *aut* 2 *utrinque instructa.*	
DIVISIO III. Antennæ in eâdem fere lineâ horizontali insertæ.	
Antennæ interiores sublongiores. Pedes 2 antici submonodactyli.	20. ANTHURA.
DIVISIO IV. Antennæ per paria uno super alium positæ.	
Subdivisio 1. Cauda lamellâ unicâ utrinque.	
Cauda appendice curvato, compresso.	21. CAMPECOPÆA.
Cauda appendice recto, subcompresso.	22. NÆSA.
Subdivisio 2. Cauda lamellis 2 utrinque.	
* *Antennæ superiores pedunculo amplissimo. Ungues bifidi.*	
Cauda emarginata interjectâ lamellâ, appendicibus haud foliaceis.	23. CYMODICE.
Cauda emarginata, appendicibus compressis foliaceis.	24. DYNAMENE.
Cauda integra, appendicibus compressis foliaceis.	25. SPHÆROMA.

** *Antennæ*

** *Antennæ superiores pedunculo amplissimo. Ungues simplices.*	*Genera.*
Oculi granulati, magni, laterales.	26. ÆGA.
*** *Antennæ superiores pedunculo mediocri.*	
Oculi distincti, non granulati. Caput segmenti corporis antici latitudine.	27. EURYDICE.
Oculi granulati. Caput segmenti corporis antici latitudine.	28. LIMNORIA.
Oculi obscuri. Caput segmento corporis antico angustius.	29. CYMOTHOA.
C. *Cauda setis duabus terminata.*	
DIVISIO V. - - - - -	30. APSEUDES.
D. *Cauda stylifera.*	
DIVISIO VI. Antennæ interiores distinctæ.	
Subdivisio 1. Styli caudales exserti. Pedes antici monodactyli.	
Ungues bifidi.	31. JANIRA.
Ungues simplices.	32. ASELLUS.
Subdivisio 2. Styli caudales haud exserti. Pedes antici simplices.	33. JÆRA.
DIVISIO VII. Antennæ interiores haud distinctæ.	
Subdivisio 1. Styli caudales bini, caule duplici.	
Antennæ articulo ultimo multiarticulato.	34. LIGIA.
Subdivisio 2. Styli caudales quatuor, lateralibus biarticulatis.	
* *Corpus in globum haud contractendum.*	
a. *Antennæ externæ articulis octo.*	
Antennæ externæ basi nudæ. *Cauda* abrupte corpore angustior.	35. PHILOSCIA.
Antennæ externæ sub capitis margine antico insertæ.	36. ONISCUS.
b. *Antennæ externæ articulis septem.*	
Antennæ externæ sub capitis margine antico insertæ.	37. PORCELLIO.
** *Corpus in globum contractile.*	
Antennæ externæ 7-articulatæ, in capitis cavitate marginibus insertæ.	38. ARMADILLO.

SECTIO I.

Corpus lateraliter compressum. *Pedes* 14. *Antennæ* 2 in frontem insertæ, unâ utrinque. (*Cauda* stylis instructa.)

Gen. 1.

Gen. 1. Phronima, *Latr.*

Caput magnum, nutans; *antennæ* biarticulatæ, articulo primo parvo. *Thorax* 7-articulatus, segmentis omnibus pedigeris. *Pedes* compressi; paria duo antica articulo antepenultimo ad apicem processu foliaceo instructa; articulo penultimo apice bifido, ungue minuto terminato: paria 3 et 4 simplicia longiora, subcrassiora ungue arcuato terminata: par quintum magnum longissimum, crassius, didactylum, articulo primo ad apicem gradatim subincrassato; secundo subtrigono; tertio ovato ad basin subabrupte angustato; ultimo ad basin angustato digitis curvatis interne unidentatis; paria 6 et 7 simplicia, ungue subrecto terminata. *Abdomen* triarticulatum, segmento singulo utrinque appendice duplici pedunculo insistente instructo. *Cauda* biarticulata; articulo primo infra utrinque processu biarticulato stylis duobus terminato; articulo secundo processibus quatuor stylis duobus instructis, processu inferiore biarticulato, superiore triarticulato.

Spec. 1. *Phronima sedentaria.*

P. pedibus quintis pollice apice indiceque basi interne denticulatis.
Phronima sedentaria. *Latr. Gen. Crust. et Insect.* i. 57.
Leach, Edin. Encycl. vii. 403-433.
Cancer *gammarellus* sedentarius. *Herbst*, ii. 136. *tab.* 37. *fig.* 8.
Cancer sedentarius. *Forsk. Fn. Arab.* 95.

Apud Burray in Zetlandiâ, Nov. 3, 1809, detexit Rev. Dr. Fleming, qui summâ cum benignitate mihi communicavit.

SECTIO II.

Corpus lateraliter compressum. *Cauda* stylis plurimis. *Pedes* quatuordecim; *coxæ* lamelliformes. *Antennæ* quatuor per paria insertæ.

DIVISIO I.

Antennæ 4-articulatæ, articulo ultimo e plurimis segmentis minutis efformato; *superiores* brevissimæ, inferiorum pedunculo breviores.

Gen. 2. TALITRUS, *Latr., Bosc.*

Pedes quatuor antici in utroque sexu subæquales, monodactyli. *Antennæ* superiores articulis duobus inferiorum basilaribus breviores.

Spec. 1. *Talitrus Locusta.*

T. antennis subtestaceo-rufis maris corpore longioribus fœminæ brevioribus, corpore cinereo: colore saturatiore vario.

Oniscus Locusta. *Pallas?*

Talitrus Locusta. *Latr. Gen. Crust. et Insect.* i. 58.
Leach, Edin. Encycl. vii. 402.

Cancer *gammarus* saltator. *Montagu, Trans. Linn. Soc.* ix. 94.

Astacus Locusta. *Penn. Brit. Zool.* iv. 21.

Habitat in arenosis maritimis passim. Talitrus littoralis, *Leach, Edin. Encycl.* vii. 402. fœmina.

Gen. 3. ORCHESTIA.

TALITRUS, *Latr.*

Pedum paria quatuor antica MARIS monodactyla, pari secundo manu compressâ magnâ; FŒMINÆ pari antico monodactylo, secundo didactylo. *Antennæ* superiores articulis duobus basilaribus inferiorum haud longiores.

Spec. 1. *Orchestia littorea.*

Cancer (littoreus) *Gammarus. Montagu, Trans. Linn. Soc.* ix. 96.

Pulex marinus. *Bast. Opusc. Subs.* ii. 31?

Talitrus gammarellus. *Latr. Gen. Crust. et Ins.* i. 57?

Orchestia littorea. *Leach, Edin. Encycl.* vii. 402.

Habitat ad littora maris passim, rejectamentis, cadaveribus victitans.

DIVISIO

DIVISIO II.

Antennæ quadriarticulatæ, articulo ultimo e segmentis plurimis aliis distinctis efformato; superioribus subbrevioribus.

Gen. 4. Atylus.

Antennæ superiores articulo secundo tertio longiore; *inferiores* articulo secundo tertio subbreviore. *Oculi* subprominentes, rotundati, inter antennas in capitis processum utrinque inserti. *Cauda* utrinque stylis duplicibus tribus, et superne stylulo utrinque mobili instructa.

Obs. Generi Dexamini valde affine est hoc genus.

Spec. 1. *Atylus carinatus.*

A. capite rostro descendente, abdomine segmentis quinque ultimis carinatis posticeque acute productis.

Gammarus carinatus. *Fabr. Ent. Syst.* ii. 515. 3.

Atylus carinatus. *Leach, Zool. Miscell.* ii. 22. *tab.* 69.

Habitat ———

Mus. Britan.

DIVISIO III.

Antennæ triarticulatæ, articulo ultimo e plurimis aliis distinctis confecto, superioribus longioribus.

Gen. 5. Dexamine.

Pedes quatuor antici subæquales, monodactyli, *manu* compressâ filiformi-subovatâ, armati. *Antennæ* segmento primo secundo breviore. *Oculi* oblongi, haud prominentes, pone antennas superiores inserti. *Cauda* utrinque stylis duplicibus tribus, superneque stylo utrinque mobili instructa.

 Spec. 1.

Spec. 1. *Dexamine spinosa.*

D. segmentis abdominis posticis in spinis productis.
Cancer *Gammarus* spinosus. *Montagu, Linn. Trans. vol.* xi. 3.
Dexamine spinosa. *Leach, Edin. Encycl.* vii. 433.
——, *Zool. Miscell.* ii. 24.
Habitat in Angliæ occidentali mari rarior.

Gen. 6. Leucothöe.

Pedum par anticum didactylum, *pollice* biarticulato, articulo basilari subovato; par secundum manu dilatatâ, compressâ, *pollice* curvato instructâ.

Spec. 1. *Leucothöe articulosa.*

Cancer articulosus. *Montagu, Linn. Trans.* vii. 71. *t.* 6. *f.* 6.
Leucothöe articulosa. *Leach, Edin. Encycl.* vii. 403.
Habitat in mari Britannico, rarissime.

DIVISIO IV.

Antennæ 4-articulatæ, articulo ultimo e plurimis articulis efformato; *superiores* longiores.

SUBDIVISIO 1.

Pedum par secundum maris manu dilatatâ compressâ.

Gen. 7. Melita.

Pedum paria duo antica monodactyla; par secundum digito in palmam inflexo. *Cauda* lamellâ utrinque elongatâ, foliaceâ.

Spec. 1. *Melita palmata.*

M. corpore nigricante, antennis pedibusque pallido annulatis.
Cancer palmatus. *Montagu, Linn. Trans.* vii. 69.
Melita palmata. *Leach, Edin. Encycl.* vii. 403.
Habitat maris Danmoniæ littora sub lapidibus passim.

Gen. 8.

Gen. 8. Mæra.

Pedum paria duo antica monodactyla, par secundum digito in latus inflexo. *Cauda* stylis nullis foliaceis.

Spec. 1. *Mæra grossimana.*

Cancer *Gammarus* grossimanus. *Montagu, Tr. L. Soc.* ix. 97. *t.* 4. *f.* 5.
Mæra grossimana. *Leach, Edin. Encycl.* vii. 403.
Habitat ad Danmoniæ littora scopulosa sub lapidibus vulgatissime.

SUBDIVISIO 2.

Pedum paria duo antica in utroque sexu monodactyla conformia.

Gen. 9. Gammarus.

Antennæ superiores ad basin articuli quarti setâ parvulâ articulatâ instructæ. *Cauda* superne fasciculato-spinosa.

* *Cauda stylis geminatis superioribus stylo supero brevissimo.*

Spec. 1. *Gammarus aquaticus.*

G. processu inter antennas obtuso rotundato.
Gammarus Pulex. *Leach, Edin. Encycl.* vii. 402—432.
Habitat in rivulis et stagnis vulgatissime.

Spec. 2. *Gammarus marinus.*

G. processu inter antennas subacuminato.
Habitat in Danmoniæ australis mari.

** *Cauda stylis geminatis superioribus stylis subæqualibus.*

Spec. 3. *Gammarus Locusta.*

G. oculis lunatis.
Cancer *Gammarus* Locusta. *Montagu, Linn. Trans.* ix. 92.
Gammarus Locusta. *Leach, Edin. Encycl.* vii. 403.
Habitat in Britanniæ mari vulgatissime.

Spec. 4.

Spec. 4. *Gammarus Campylops.*

G. oculis flexuosis.
Gammarus campylops. *Leach, Edin. Encycl.* vii. 403.
Habitat in mari prope Loch-Ranza in Arran Insulâ.

Gen. 10. AMPITHÖE.

Antennæ superiores setâ nullâ ad articuli quarti basin. *Cauda* superne haud fasciculato-spinosa. *Manus* ovatæ.

Spec. 1. *Ampithöe rubricata.*

Cancer *Gammarus* rubricatus. *Montagu, Linn. Trans.* ix. 99.
Gammarus rubricatus. *Leach, Edin. Encycl.* vii. 402.
Ampithöe rubricata. *Leach, Edin. Encycl.* vii. 432.

Gen. 11. PHERUSA.

Antennæ superiores setâ nullâ ad articuli quarti basin. *Cauda* superne haud fasciculato-spinosa. *Manus* filiformes.

Spec. 1. *Pherusa fucicola.*

P. testaceo-cinerea aut griseo-cinerea rubro-varia.
Pherusa fucicola. *Leach, Edin. Encycl.* vii. 432.
Habitat inter fucos in Danmoniæ australis mari rariùs.

DIVISIO V.

Antennæ 4-articulatæ, inferiores longiores, pediformes. (*Pedes* quatuor antici monodactyli.)

SUBDIVISIO 1.

Pedum par secundum manu magnâ.

Gen. 12. PODOCERUS.

Oculi prominuli. *Pedum* paria duo antica monodactyla.

Spec. 1.

Spec. 1. *Podocerus variegatus.*

P. albo rufoque variegato.
Podocerus variegatus. *Leach, Edin. Encycl.* vii. 433.
Habitat inter confervas marinas.

Gen. 13. JASSA.

Oculi haud prominuli. *Pedes* quatuor antici monodactyli, manibus ovatis; par secundum majus latere interno armato aut subrecto dentibus instructo.

Spec. 1. *Jassa pulchella.*

J. pollice secundo latere interno ad basin emarginato.
Var. α. manu secundâ dente elongato, obtuso ad interni lateris basin.
Var. β. manu secundâ latere interno tridentatâ.
Jassa pulchella. *Leach, Edin. Encycl.* vii. 433.
Habitat inter fucos in Danmoniæ australis mari. Color albicans, rufo pictus.

Spec. 2. *Jassa pelagica.*

J. manu secundâ latere interno lunato-emarginato.
Corpus cinereo-subpellucidum fusco variegatum.
Habitat in mari Scotico apud the Bell Rock. Cum copiâ animalium communicavit amicus R. Stephenson.
OBS. Gammarus falcatus, *Montagu, Trans. Linn. Soc.* ix. ad hoc genus pertinere videtur.

SUBDIVISIO 2.

Pedum par secundum manu haud magnâ.

Gen. 14. COROPHIUM, *Latr.*

CANCER, *Linn.*
ASTACUS, *Penn.*

Spec. 1.

Spec. 1. *Corophium longicorne.*

Cancer grossipes. *Linn. Syst. Nat.* i. 1055.
Astacus grossipes. *Penn. Brit. Zool.* iv. *pl.* 16. *f.* 31.
Corophium longicorne. *Latr. Gen. Crust. et Ins.* i. 59.
Leach, Edin. Encycl. vii. 403—432.

SECTIO III.

Corpus depressum.

A. *Cauda inermis.*

DIVISIO I.

Corpus 6-articulatum, segmentis omnibus cum capitis basi pedigeris. *Pedes* 14; *paria duo antica* ungue mobili, (pollice) instructa; *par anticum* minus, ad caput annexum, carpo articulato; *paria tertium* et *quartum* sæpius spuria; *paria sex posteriora* coxis aliquot productis, *unguibus* validis armata. *Antennæ* quatuor, superiores longiores. *Os* palpis duobus apice ungulatis. *Anus* tuberculis parvis obscuris. *Bursa* (*uterus externus*) valvulis imbricata inter fœminæ pedum paria tertium et quartum sita est, quâ ova, pullique post exclusionem educantur.

Animalia parasitica in Oceano degentia, Fucis, Cetaceis (Piscibusque?) arcte affigentia.

SUBDIVISIO 1.

Corpus lineare. Oculi pone antennas superiores siti. Antennæ 4-articulatæ: superiores segmento ultimo aliorum longitudine, e plurimis aliis compositis: inferiores subcompressæ, superioribus dimidio minores. Pedum par anticum (*Palpi* Montagu) *os prope situm; secundum manu sæpiùs intus dentatâ.*

Gen. 15. Proto.

Pedum paria secundum, tertium et quartum basi appendiculata. *Pedes* omnes validè unguiculati.

Ad

Ad hoc genus pertinet *Squilla pedata,* forte etiam *ventricosa?* Mülleri.

Gen. 16. CAPRELLA.

Pedum paria secundum, tertium et quartum haud appendiculata ad basin; paribus tertio et quarto spuriis, globosis, subgelatinosis.

Ad hoc genus *Astacus atomos* Pennant, *Squilla lobata* Müller, et *Cancer Phasma* Montagu pertinent.

Habitat in mari inter fucos, geometricè movens.

The specific characters may be taken from the number and situation of spines in the head and back, form of the second pair of feet, &c. The synonyms are at this time so confused that I cannot venture to describe or name those in my collection, amounting to four indigenous species.

SUBDIVISIO 2.

Corpus latum. Oculi in verticem siti. Antennæ 4-articulatæ, superiores longiores, articulo basilari paulo majore, secundo tertioque æqualibus basilari paululum minoribus, ultimo minuto penultimo quadruplo minore; inferiores articulo basilari superiorum breviores articulo ultimo minuto. Pedes compressi valide unguiculati; paria duo antica pollice instructa; par anticum minimum ad capitis basin adnexum, carpo articulato, secundum majus manu intus dentatâ, tertium et quartum coriaceo-membranacea, cylindrica, elongata, spuria. Anus productus, tuberculis obscuris parvis.

Bursa (uterus externus) valvulis quatuor imbricata.

Gen. 17. LARUNDA.

CYAMUS, *Latreille, Lamarck.*

PANOPE, *Leach.*

 Spec. 1.

Spec. 1. *Larunda Ceti.*

Oniscus Ceti. *Linn. Syst. Nat.* i. 1060.
Squille de la Baleine. *De Geer, Mém. sur les Ins.* vii. *pl.* 42. *f.* 6. 7.
Pycnogonum Ceti. *Fabr. Suppl. Ent. Syst.* 670.
Cyamus Ceti. *Latr. Gen. Crust. et Ins.* i. 60.
Panope Ceti. *Leach, Edin. Encycl.* vii. 404.
Habitat in balænis (*etiam in scombris,* Latreille).

DIVISIO II.

Corpus segmentis omnibus haud pedigeris; segmentum ultimum caudæ maximum. *Antennæ* filiformes, mediæ brevissimæ, exteriores ad corporis dimidium longitudinis et ultra. *Ungues* validi.

Gen. 18. IDOTEA.

Antennæ exteriores dimidium aut minus corporis longitudinis æquantes, articulis tertio quartoque æqualibus. *Corpus* ovatum.

Spec. 1. *Idotea Entomon.*

I. corpore elongato-ovato, caudâ apice tridentatâ: dente intermedio majore, antennis dimidium corporis longitudinem fere æquantibus.

Oniscus Entomon. *Linn. Syst. Nat.* i. 1060.
Penn. Brit. Zool. iv. *pl.* 18. *fig.* 5.

Habitat in mari Britannico passim inter fucos.

Color cinereus, fusco-punctatissimus, sæpe cremore maculatus.

This species, which is very common on all our rocky coasts, varies much in the form of the extremity of the tail, often occurring without the lateral teeth, which is ever the case (as far as I have examined) in younger specimens. *Oniscus marinus* of Pennant, plate xviii. fig. 3, appears to be the variety above mentioned. Length one inch and a quarter.

Spec. 2. *Idotea pelagica.*

I. corpore lineari-ovato, caudâ rotundatâ medio dente obsoletissimo antennis tertiam corporis longitudinem æquantibus.

Habitat in mari Scotico; ab amico R. Stephenson, Armigero, cum animalium copiâ, accepi.

Mr. Stephenson sent me this species from the Bell Rock, and afterwards in the most obliging manner procured for me a large log perforated by *Limnoria terebrans,* which contained a vast number of them in the deserted cavities formed by that animal.

Colour when alive ash-gray or fuscous, speckled with darker fuscous, and often variegated or mottled with white spots; legs pale. The female seems very rare, as amongst four hundred only one occurred. Length one inch and a quarter.

Spec. 3. *Idotea Œstrum.*

I. corpore elongato-ovato, caudâ truncatâ emarginatâ, antennis tertiam corporis longitudinem æquantibus.

Oniscus Œstrum. *Penn. Brit. Zool.* iv. *pl.* 18. *fig.* 6.

Long. Corp. $1\frac{1}{4}$ unc.

We have never met with a living specimen of this animal, but have received it from our liberal friend Montagu, who considers it as a mere variety of *Entomon;* it differs from Entomon in wanting the teeth at the extremity of the tail, and having a deep notch instead. The antennæ, too, are evidently shorter.

Gen. 19. STENOSOMA.

Antennæ exteriores corporis longitudine, articulo tertio quarto longiore. *Corpus* lineare.

 Spec. 1.

Spec. 1. *Stenosoma lineare.*

S. caudâ segmento ultimo basi subangustato apicem versus dilatatâ: apice truncato emarginato.

Oniscus linearis. *Penn. Brit. Zool.* iv. *pl.* 18. *fig.* 2.

Spec. 2. *Stenosoma acuminatum.*

S. caudâ segmento ultimo acuminato.

Stenosoma acuminatum. *Leach, Edin. Encycl.* vii. 433.

Habitat in mari Danmoniæ: semel obvium.

B. *Cauda lamellis duabus utrinque instructa.*

DIVISIO III.

Caudæ segmentum penultimum brevissimum; ultimum angustius elongatum, utrinque lamellis duabus elongatis. *Antennæ* subæquales, unâ post alteram in lineâ fere horizontali insertæ.

Gen. 20. Anthura.

Antennæ breves, interioribus paululum longioribus. *Pedes* anteriores manu ungue seu pollice instructi. *Corpus* lineare. *Cauda* lamellis duabus foliaceis utrinque instructa.

Spec. 1. *Anthura gracilis.*

Oniscus gracilis. *Montagu, Linn. Trans. vol.* ix. *tab.* 5. *fig.* 6.

Anthura gracilis. *Leach, Edin. Encycl.* vii. 404.

It is probable that *Oniscus cylindricus* of Montagu, *Linn. Trans. vol.* vii. *tab.* 6. *fig.* 8. is referable to this family.

DIVISIO IV.

Caudæ segmentum ultimum maximum utrinque appendiculatum. *Antennæ* per paria uno super alium positæ.

SUBDIVISIO

SUBDIVISIO 1.

Caudæ segmentum ultimum appendice utrinque simplici.

Gen. 21. CAMPECOPEA.

Cauda segmento ultimo appendice curvatâ compressâ utrinque instructa. *Corpus* 6-articulatum, articulo ultimo aliorum magnitudine. *Antennæ* setaceæ, superæ longiores, pedunculo biarticulato. *Spatium* inter antennas amplissimum. *Ungues* (antici saltem) bifidi; reliquas haud vidi.

Spec. 1. *Campecopea hirsuta.*

Oniscus hirsutus. *Montagu, Linn. Trans. vol.* vii. *tab.* 6. *fig.* 8.
Campecopea hirsuta. *Leach, Edin. Encycl.* vii. 405.

Gen. 22. NÆSA.

Cauda segmento ultimo utrinque appendice rectâ subcompressâ, pedunculo adnexo. *Corpus* 6-articulatum, articulo ultimo majore. *Antennæ* setaceæ, subæquales, superiores pedunculo amplissimo, biarticulato, articulo basilari majore. *Spatium* inter antennas facillime discernendum. *Ungues* bifidi.

Spec. 1. *Næsa bidentata.*

Oniscus bidentatus. *Adams, Linn. Trans. vol.* v. 8. *tab.* 2. *fig.* 3.
Næsa bidentata. *Leach, Edin. Encycl.* vii. 405.

SUBDIVISIO 2.

Caudæ segmentum ultimum appendicibus duabus foliaceis, stylove bifido, instructum.

* *Antennæ superiores pedunculo amplissimo. Ungues bifidi.* (*Caput postice ad latera subbilobatum, lobis oculiferis.*)

Gen. 23.

Gen. 23. Cymodice.

Oculi ad segmenti attingentes marginem anteriorem antici. *Corpus* 7-articulatum. *Cauda* basi utrinque appendicibus duabus subcompressis, haud foliaceis, exterioribus majoribus; *apex* emarginatus, interjectâ lamellâ. *Ungues* bifidi.

Speciem indigenam possideo (Oniscus truncatus, *Montagu, Mss.*).

Cymodyce truncata. *Leach, Edin. Encycl.* vii. 433.

Gen. 24. Dynamene.

Oculi ad segmenti antici marginem anteriorem haud attingentes. *Corpus* 7-articulatum. *Cauda* basi utrinque appendicibus duabus æqualibus foliaceis instructa; *apex* emarginatus, lamellâ nullâ interjectâ. *Ungues* bifidi.

Dynamene. *Leach, Edin. Encycl.* vii. 433.

Species tres Britannicas possideo.

Gen. 25. Sphæroma, *Latr.*

Oculi ad marginem anteriorem corporis segmenti primi haud attingentes. *Corpus* 7-articulatum. *Cauda* apice integra, basi utrinque appendicibus duabus foliaceis æqualibus instructa. *Ungues* bifidi.

Spec. 1. *Sphæroma serrata.*

S. corpore lævi inermi, caudâ lævissimâ utrinque oblique truncatâ, lamellis ellipticis acutis; externis externe serratis.

Oniscus Globator. *Pallas Sp. Zool. fasc.* ix. *tab.* 4. *fig.* 18.

Cymothoa serrata. *Fabr. Ent. Syst.* ii. 510.

Sphæroma cinerea. *Latr. Gen. Crust. et Ins.* i. 65.

Habitat ad oceani Europæi littora.

Oculi nigri. *Antennæ* fulvæ. *Pedes* cinerei, unguibus fulvis, apice nigro. *Corpus* cinereum vel albidum rufo-marmoratum.

This species is very common on the rocky shores of Devonshire, Kent, and Cornwall.

Spec. 2.

Spec. 2. *Sphæroma rugicauda.*

S. corpore lævi inermi, caudâ rugulosâ: lateribus oblique truncatis, lamellis ellipticis; externis margine externo vix denticulatis.

Sphæroma rugicauda. *Leach, Edin. Encycl.* vii. 405-433.

Habitat in oceano Atlantico.

Mus. Leach.

Statura et magnitudo præcedentis, et satis distincta, caudâ rugosâ, lamellis rotundatis nec acutis, antennarum inferiorum pedunculo longè minus crasso. Color cinereus, nigro lineatus, maculatusque. Oculi nigri.

I discovered this species on the Isle of Ulva, one of the Western Isles, over against Mull, in the month of August. It was much more agile than *S. serrata*, which called my attention to minute examination. I met with several, but owing to an accident only one remains.

Spec. 3. *Sphæroma Hookeri.*

S. corpore lævi, caudæ articulo ultimo tuberculis duobus oblongatis subobscuris.

Sphæroma Hookeri. *Leach, Edin. Encycl.* vii. 433.

Habitat in Suffolciâ ad littora maris; color cinereus aut rufescens, punctulis nigris sparsus. Cum copiâ crustaceorum benignissime communicavit amicus W. J. Hooker, cujus nomen gerit.

** *Antennæ superiores pedunculo amplissimo. Ungues simplices.*

Gen. 26. Æga.

Oculi magni, granulati, oblongi, obliqui, marginales. *Corpus* 7-articulatum. *Cauda* 6-articulata, articulo ultimo majore, basi utrinque appendicibus duabus foliaceis instructa.

Spec. 1.

Spec. 1. *Æga emarginata.*

Æ. caudâ articulo ultimo acuminato; processu interiore apice internè obliquè truncato externè emarginato.

Habitat ———

An sit Oniscus Psora. *Penn. Brit. Zool.* iv. *pl.* 18. *fig.* 1?

Spec. 2. *Æga tridens.*

Æ. caudâ articulo ultimo tricarinato: carinis ultra apicem in dentes productis; processu interiore truncato.

Habitat in Mari Scotico.

Mus. Sowerby.

*** *Antennæ superiores pedunculo mediocri.*

Gen. 27. Eurydice.

Oculi distincti, laterales, non granulati. *Caput* segmenti antici corporis latitudine. *Corpus* 7-articulatum. *Cauda* 6-articulata, articulo ultimo majore. *Ungues* simplices. *Antennæ inferiores* corporis longitudine.

Spec. 1. *Eurydice pulchra.*

E. caudâ articulo ultimo semiovali.

Habitat in mari apud Bantham in Danmoniâ australi vulgatissimè, celerrimè natans.

Color cinereus pulcherrimè nigro irroratus.

Gen. 28. Limnoria.

Caput corporis segmento antico latitudine æquale. *Oculi* distincti granulati. *Cauda* segmentis plurimis corpore vix angustioribus, ultimo subrotundato.

Antennæ

Antennæ infernè per paria insertæ, unâ super alteram positâ. Oculi e granulis (*octo aut septem) efformati.

Spec. 1. *Limnoria terebrans.*

L. corpore cinereo, oculis subpiceo-atris.
Limnoria terebrans. *Leach, Edin. Encycl.* vii. 433.
Long. Corp. 1 lin. et $1\frac{1}{2}$ aut 2 lin.

This new and highly interesting species I received through the politeness of my attentive and worthy friend R. Stephenson, Esq. It occurs in the greatest abundance at the Bell Rock, in the old wood-work used whilst the lighthouse was building, which it perforates in a most alarming manner, entering to the depth of two inches or more, boring in every direction. They seldom or never deviate from a straight line in their perforations, unless interrupted in their progress by a knot in the wood, when they pass round it. The female is one-third larger than the male, and may be readily distinguished by its pouch, which is easily seen, and in which the eggs and young ones after their exclusion are carried. The young ones in those I examined were generally seven in number, in some few nine, and in one instance only five. When alive it can contract nearly into a ball. I was at first induced to place it in the genus *Cymothoa*, but a more careful observation clearly proved it not to be referable to that genus.

Gen. 29. CYMOTHOA, *Fabr.*, *Dald.*, *Latr.*

Caput angustum, parvum. *Segmentum* secundum anticè emarginatum ad caput recipiendum, angulis anticis porrectis cum capite lineam rectam delinientibus. *Cauda* segmentis plurimis corpore angustioribus, ultimo majori transversè subquadrato, basi utrinque stylis duobus pediculo impositis. *Oculi* obscuri.

* I mention the number with some doubt; seven granules are arranged in a circle, and in a certain light there seems to be another in the centre.

 Spec. 1.

Spec. 1. *Cymothoa Œstrum.*

Cymothoa Œstrum. *Fabr. Ent. Syst.* ii. 505.
Latr. Gen. Crust. et Ins. i. 66.

C. *Cauda setis duabus terminata.*

DIVISIO V.

Corpus sexarticulatum. *Cauda* sexarticulata, articulo ultimo majore, setâ utrinque instructa. *Pedes* 14; par anticum didactylum, par secundum compressum dentatum, paria tertium et quartum consimilia, simplicia, par quintum ungue duplici? paria sextum et septimum spuria. *Antennæ* quatuor, superiores pedunculo biarticulato apice setâ multiarticulatâ armatæ, inferiores bifurcatæ.

Gen. 30. Apseudes.

Spec. 1. *Apseudes Talpa.*

A. testâ anticè acutâ rostriformi lineis tribus longitudinalibus exaratis.

Cancer *Gammarus* Talpa. *Montagu, Trans. Linn. Soc.* ix. *t.* 4. *f.* 6.
Apseudes Talpa. *Leach, Edin. Encycl.* vii. 404.
Color flavicante-albus.
Habitat in oceano Britannico rariùs.

D. *Cauda stylifera.*

DIVISIO VI.

Antennæ quatuor, interiores distinctæ.

SUBDIVISIO 1.

Styli exserti. Pedes antici majores, manu monodactylâ.
Gen. 31.

Gen. 31. JANIRA.

Ungues bifidi. *Oculi* mediocres lateraliter subverticales. *Antennæ* interiores articulo setifero exteriorum breviores.

Spec. 1. *Janira maculosa.*

J. corpore cinereo fusco maculato.
Oniscus maculosus. *Montagu, Mss.*
Janira maculosa. *Leach, Edin. Encycl.* vii. 434.
Habitat inter fucos et ulvas.

Gen. 32. ASELLUS. *Geof., Oliv., Latr., Lam.*

Ungues simplices. *Oculi* minuti laterales. *Antennæ* interiores articulo setifero exteriorum longitudine.

Spec. 1. *Asellus aquaticus.*

Oniscus aquaticus. *Linn. Syst. Nat.* i. 1061.
Asellus vulgaris. *Latr. Gen. Crust. et Ins.* i. 63.
Leach, Edin. Encycl. vii. 404.
Idotea aquatica. *Fabr. Suppl. Ent. Syst.* 303.

SUBDIVISIO 2.

Styli minutissimi vix exserti. Pedes antici aliis haud crassiores.

Gen. 33. JÆRA.

Oculi mediocres laterali-subverticales.

Spec. 1. *Jæra albifrons.*

J. cinereus fronte albicante.
Oniscus albifrons. *Montagu, Mss.*
Jæra albifrons. *Leach, Edin. Encycl.* vii 434.
Habitat inter fucos et sub lapidibus vulgatissimè.

DIVISIO VII.

Antennæ quatuor, interiores brevissimè vix conspicuæ.

SUBDIVISIO 1.

"*Styli caudales bini caule duplici, stipitis articulive communis baseos apice inserto.*" Latr.

Gen. 34. Ligia, *Latr.*

Antennæ externæ articulo ultimo e pluribus aliis composito.

Spec. 1. *Ligia oceanica.*

L. antennis corporis longitudine, dorso subscabroso.

Ligia oceanica. *Fabr. Suppl. Ent. Syst.* 301.

Habitat ad littora maris; colore, magnitudine, et articulorum antennarum exteriorum numero valde varians.

The illustrious Latreille, in describing the species of this genus, has considered the number of joints in the last segment of the antennæ an unerring mark of specific distinction; but we have found on examination that these parts are subject to great variety, not only in the same species, but even in the same individual, the antennæ of the left side having two or three joints more or less than those of the right side. Other marks must therefore be looked for; and probably sculpture or degree of roughness is that which will be found to distinguish the species.

Ligia oceanica and *L. Scopulorum* of the Edinburgh Encyclopedia are merely varieties of this species.

SUBDIVISIO 2.

Styli caudales quatuor, lateralibus biarticulatis.

* *Corpus in globum haud contractile.*

a. *Antennæ externæ articulis octo.*

Gen. 35. Philoscia, *Latr.*

Antennæ externæ basi nudæ. *Cauda* corpore abruptè angustior.

Spec. 1.

Spec. 1. *Philoscia Muscorum.*

Oniscus Muscorum. *Scopoli, Ent. Carn.* 1105.
Oniscus sylvestris. *Fabr. Ent. Syst.* ii. 397.
Philoscia Muscorum. *Latr. Gen. Crust. et Ins.* i. 69.
Leach, Edin. Encycl. vii. 406.
Habitat in Galliâ, Germaniâ, Sueciâ, Angliâ, sub lapidibus.

Gen. 36. Oniscus.

Antennæ externæ sub capitis margine antico prominulo insertæ.

Spec. 1. *Oniscus Asellus.*

Oniscus Asellus *auctorum.*
Oniscus murarius. *Fabr. Suppl. Ent. Syst.* 300.

b. *Antennæ externæ articulis septem.*

Gen. 37. Porcellio, *Latr.*

Antennæ externæ sub capitis margine antico prominuloque insertæ. *Styli* caudales laterales prominuli, conici.

Spec. 1. *Porcellio scaber.*

P. corpore scabro.
Oniscus Asellus. *Fabr. Suppl. Ent. Syst.* 300.
Porcellio scaber. *Latr. Gen. Crust. et Ins.* i. 70.
Leach, Edin. Encycl. vii. 406.
Habitat in Europâ sub ligno putrido, et sub lapidibus passim.

Spec. 2. *Porcellio lævis.*

P. corpore lævi.
Porcellio lævis. *Latr. Gen. Crust. et Ins.* i. 71.
Leach, Edin. Encycl. vii. 406.
Habitat cum præcedente. In Britanniâ semel obvius.
Mus. Nostr.

** *Corpus*

** *Corpus in globum contractile.*

Gen. 38. Armadillo, *Latr.* Oniscus, *Linn.*

Antennæ externæ 7-articulatæ, in cavitate marginibus prominula insertæ. *Styli* caudæ laterales haud prominuli, articulo apicis triangulari, cum ultimi segmenti margine connivente. *Latr.*

Spec. 1. *Armadillo vulgaris.*

Armadillo vulgaris. *Latr. Gen. Crust. et Ins.* i. 71.
Oniscus Armadillo. *Linn. Syst. Nat.* i. 1062.

Classis II. MYRIAPODA*.

Ordo I. Chilognatha, *Latr.*

Maxillæ nullæ. *Palpi* indistincti. *Labium* inerme.

Ordo II. Syngnatha.

Maxillæ duæ distinctæ, basi connatæ. *Palpi* duo maxillares filiformes; duo labiales ungulâ terminati.

Ordo I. Chilognatha.

Fam. I. Glomerides.

Corpus in globum contractile. *Antennæ* capitis paginæ supernæ insertæ. *Oculi* distincti.

Gen. 1. Glomeris, *Latr.*

Pedes utrinque 16.

* This class was arranged with the *Arachnides* by Latreille.

Spec. 1.

Spec. 1. *Glomeris pustulata, Latr.*

Habitat in Lusitaniâ frequens.

Spec. 2. *Glomeris marginata.*

Oniscus marginatus. *Vill. Entom.* iv. 187. *t.* 11. *f.* 15.
Oniscus zonatus. *Panz. Fn. Ins. Germ.* ix. 25.
Glomeris limbata. *Latr. Gen. Crust. et Ins.* i. 74.
Julus oniscoides. *Town.*
Stew. Elem. Nat. Hist. ii.
Habitat in Europâ sub lapidibus.

Fam. II. Julides.

Corpus in globum haud contractile. *Antennæ* capitis paginæ supernæ insertæ. *Oculi* distincti.

Gen. 2. Julus.

Corpus serpentiforme, cylindricum. *Antennarum* articulus secundus tertio longior.

The following species were all described from living specimens. The principal characters of distinctions are colour, size, and the form of the anal segment. The number of legs, which has been considered the most permanent character, is of no value, as it varies continually in the same species.

Spec. 1. *Julus sabulosus.*

J. nigro-cinereus lineis duabus dorsalibus rufescentibus, segmento ultimo mucronato, pedibus luteis.

Julus sabulosus. *Linn., Fabr., Latr.*

Long. Corp. 1½ unc.

Habitat in Europæ sabulosis inter muscos et sub lapidibus passim. Corpus longitudinaliter lineolatum, lineis vix subundulatis. Facies flava nigro-punctulata.

This

This species may readily be distinguished from all the rest by the thickness of its body, by the form of the mucro, which resembles the corniculus of many of the genus *Sirex*, and by its colour, which after death often changes to a blueish violet, with testaceous instead of red lines.

Spec. 2. *Julus Londinensis.*

J. brunneo-nigricans segmento ultimo submucronato: mucrone ano breviore, pedibus rufescentibus articulis pallidis.

Long. Corp. 2¼ unc.

Habitat in sylvis Londinum prope inter muscos haud infrequens.

Corpus lineolis longitudinalibus tenuissimis rectis exaratum.

After death it is frequently banded with brassy rings.

Spec. 3. *Julus niger.*

J. segmento ultimo mucronato, pedibus pallidè rufescentibus.

Long. Corp. 1½ lin.

Habitat prope Edinburgum sub lapidibus passim; in Arran Insulâ semel observavi.

Corpus fortiùs lineolatum, lineolis inæqualibus.

After death the body assumes a blueish tint.

Spec. 4. *Julus terrestris.*

J. cinereo-fuscus annulis dilutè brunneis, capite anoque dilutioribus, ventre pedibusque sublutescente-albis, segmento ultimo mucronato.

Long. Corp. 1 unc.

Julus terrestris. *Linn.*, *Fabr.*, *Latr.*

Habitat in Europæ sabulosis, sylvis.

Dorsum striis longitudinalibus rectis exaratum. Pedes articulis subfuscis.

I con-

I considered this species formerly but a mere variety of *J. niger*, but later observations have induced me to consider them as most decidedly distinct. The striæ are much stronger in this species, although it is a much smaller animal, and the colour is totally different.

Spec. 5. *Julus punctatus.*

J. segmento ultimo mucronato, corpore subpellucido pallidè subcarneo, segmentorum lateribus posticè puncto nigro.

Long. Corp. 10 lin.

Habitat sub cortice arborum et inter muscos passim.

Dorsum et latera pallidè carnea, lineis longitudinalibus tenuibus exaratis. Latera utrinque lineâ punctorum nigrorum. Venter pallidus. Pedes lutescentes. Oculi atri.

Spec. 6. *Julus pulchellus.*

J. corpore pallidissimè flavescente-albido, lateribus utrinque lineâ punctorum coccineorum, segmento ultimo inermi.

Long. Corp. 7½ lin.

Habitat in Caledoniæ, Angliæ muscis.

This beautiful species I first noticed near Edinburgh, and I have since that time found it in the Highlands of Scotland, Wales, and England, under moss. It sometimes occurs in gardens. Some of the segments near the head want the red spots. The back is very smooth, and not striated.

Spec. 7. *Julus pusillus.*

J. segmento ultimo submucronato, corpore cinerascente-nigro aut fusco-brunneo lineis duabus rufescentibus.

Long. Corp. 5 ad 6 lin.

Habitat prope Edinburgum sub lapidibus; in Battersea fields, Londinum prope, inter graminum radices. Copulatione observavi.

 β. Corpus

β. Corpus rufescens lateribus lineâque longitudinali dorsali fusco-brunneis.

Dorsum lineis fortioribus exaratis, distantibus, rectis subinæqualibus. Antennæ fuscæ articulis dilutis. Pedes lutescentes.

Gen. 3. Craspedosoma †.

Corpus lineare, depressum, segmentis lateraliter compressis, marginatis. *Antennæ* articulo secundo tertio breviore.

* *Segmentis lateribus medio prominulis.*

Spec. 1. *Craspedosoma Rawlinsii.*

C. dorso fusco-brunneo lineis quatuor punctorum albidorum, ventre pedibusque rufescentibus.

Long. Corp. 7 lin.

Habitat inter muscos et sub lapidibus prope Edinburgum vulgatissima. Detexit R. Rawlins, cujus nomen gerit.

** *Segmentis lateribus posticè productis.*

Spec. 2. *Craspedosoma polydesmoides.*

C. dorso rufo griseo, ventre pallido, pedibus rufescentibus basi pallidis, angulo segmentorum postico setigero.

Habitat in Danmoniâ prope Plymouth, sub lapidibus passim. Detexit Dom. Montagu.

Corpus rufo-griseum, pedibus pallidioribus. Dorsum lineâ longitudinaliter impressum. Segmenta valdè prominentia, angulo antico rotundato, postico retrorsum producto, setifero, setâ conicâ albâ. Facies saturate rufo-grisea. Oculi atri. Antennæ rufo-griseæ, subpilosulæ. Venter pallidus, albidus. Pedes rufescentes, basi pallidi.

† This genus was proposed by my much lamented friend Richard Rawlins, Esq. who discovered the first species.

Fam. III.

Fam. III. POLYDESMIDES.

Oculi obsoleti.

Gen. 4. POLYDESMUS, *Latr.*

Spec. 1. *Polydesmus complanatus, Latr.*

Julus complanatus. *Linn., Fabr.*

OBS. Genus *Pollyxenus* Dom. Latr. mihi invisum.

Ordo II. SYNGNATHA.

Fam. I. CERMATIDES.

Corporis segmenta tetrapoda.

Gen. 5. CERMATIA, *Illig.*

SCUTIGERA, *Latr.*

Fam. II. SCOLOPENDRIDES.

Corporis segmenta duopoda. *Pedum* par posticum reliquis manifestè longius.

Stirps 1. *Pedes utrinque* 15.

Gen. 6. LITHOBIUS.

Antennæ conico-setaceæ, articulis (45 circiter) subconicis, duobus basilaribus majoribus. *Labium* inferius latè anticè emarginatum, margine valdè denticulato. *Oculi* granulati.

Spec. 1. *Lithobius forficatus.*

L. capite lato, labio inferiore toto profundè impresso-punctato, pedibus testaceo-flavicantibus.

Scolopendra forficata. *Linn.*

Habitat in Angliâ, Hiberniâ rarior.

Long. Corp. 1 unc.

Antennæ sordidè testaceæ. Mandibulæ basi sordidè testaceæ, apice piceo-ferrugineæ. Labium sordidè testaceum, lineâ longitudinali profundiùs impressum, margine antico dentibus basi ferrugineis, apice piceo-atris. Antennæ pilosulæ.

Spec. 2. *Lithobius variegatus.*

L. capite corpore paulum latiore, labio toto punctis læviter impressis, pedibus flavo-testaceo-pallidis fusco-maculatis.

Habitat in Danmoniâ australi sub lapidibus passim.

Long. Corp. 8-9 lin.

A præcedente differt, capite angustiore, labio minus crebrè punctato, pedibusque variegatis nec concoloribus.

Spec. 3. *Lithobius Lævilabrum.*

L. capite lato (fœminæ angustiore), labio glaberrimo polito anticè leviter obscuriùs punctulato, pedibus testaceo-flavis.

Habitat in Caledoniâ et Insulis adjacentibus, sub lapidibus frequens.

Labium glaberrimum, anticè obscurè punctulatum, laciniis marginibus anterioribus rotundatis, dentibus ferrugineis extremo apice piceo-nigris, medio longitudinalitèr impresso. Mandibulæ apice piceo-atræ. Antennæ pilosulæ.

Stirps 2. *Pedes utrinque* 21.

Gen. 7. SCOLOPENDRA.

Antennæ conico-setaceæ, 17-articulatæ, articulis subconicis. *Os* galeis hemisphæricis tectum. *Palpi* exteriores cauli duplici, ultimo articulo internè compresso, apice unguibus duobus armata. *Mandibulæ* validæ, corneæ, edentulæ. *Labium* inferius fissurâ divisum, margine antico angustiori, recto, denticulato. *Corporis* segmenta marginata. *Pedes* pari antico minimo, ultimo

timo majore, articulo basilari intùs spinoso. *Oculi* octo, quatuor utrinque in capitis margine antico figuram subrhomboidalem delinientibus.

Of this genus we have no indigenous species. All the species (which I suspect to be numerous) have been confounded together under the title of *Scolopendra morsitans*, and the character given as specific applies to all the species of the genus.

* *Corporis segmenta subæqualia.*

Spec. 1. *Scolopendra Gigas.*

S. segmentis transverso-quadratis angulis rotundatis ferrugineo-brunneis posticè luteis, antennis palpis galeis pedibusque testaceis: pedibus (pari antico excepto) articulo basilari (secundoque rariùs) spinulosis.

Habitat———

Long. Corp. 9½ unc.

Mus. Dom. Jameson.

Labium ferrugineum. Mandibulæ basi ferrugineæ, apice nigræ. Totum corpus sub lente punctulatum. Ungues calcesque subpiceo-atri.

** *Corporis segmenta transversa alternantia, quinto et sexto subæqualibus.*

Spec. 2. *Scolopendra alternans.*

S. pedibus posticis articulo primo tereti internè spinuloso.

Scolopendra alternans. *Leach, Edin. Encycl.* vii.

Habitat———

Spec. 3. *Scolopendra subspinipes.*

S. pedibus posticis articulo primo subtereti supra plano ad apicem internè pauci-spinoso.

Habitat———

Mus. Britan.

Spec. 4.

Spec. 4. *Scolopendra trigonepoda.*

S. pedibus posticis trigonis articulo primo internè spinifero.

Habitat———

Mus. Britan.

*** *Corporis segmenta elongata aut subelongata irregularia.*

Spec. 5. *Scolopendra morsitans.*

Habitat in India.

Gen. 8. Cryptops.

Antennæ conico-setaceæ, 17-articulatæ, articulis globoso-subconicis. *Labium* inferius non denticulatum, margine antico vix emarginato. *Pedes* postici articulo basilari inermi. *Oculi* obscuri.

Spec. 1. *Cryptops hortensis.*

C. testaceo-ferrugineus dorso saturatiore, antennis pedibusque pilosis.

Scolopendra hortensis. *Leach, Mss. in Donovan's Brit. Ins.*

Habitat in hortis in com. Devon. haud infrequens.

Fam. III. Geophilides.

Corporis segmenta duopoda. *Pedes* duo postici haud manifestè aliis longiores.

Gen. 9. Geophilus.

Pedes plurimi. *Oculi* obscuri. (*Labium* fissurâ divisum ?) *Mandibulæ* validæ. *Antennæ* cylindricæ, in his apicem versus sensim subangustiores, in illis 14-articulatæ, articulis omnibus subcylindricis, basi paululum angustioribus.

* *Antennæ articulis brevibus.*

Spec. 1. *Geophilus carpophagus.*

G. capite antennis anoque fulvescentibus, corpore violascente anticè flavicante, pedibus pallidè subflavis.

β. Corpore

β. Corpore obscurè subviolascente-testaceo anticè subtestaceo, alias α simillima.

Long. Corp. 2—2½ unc.

Habitat in fructibus Danmoniæ passim.

Caput flavum, fulvo varium; antennæ fulvescentes, articulis apice pallidis: mandibulæ fulvescentes, punctis apiceque atris. Dorsum anticè flavicans lineâ longitudinali flavâ utrinque violascente, parte ante medium usque ad segmentum ultimum violascente, lineâ longitudinali pallidâ; latera pallida lineâ undulatâ, sinuosâ, cinereo-violascente. Venter dorsi coloris absque lineis marginalibus, parteque violascente pulcherrimè colore saturatiore maculatâ. Pedes subflavi, pallidi, articulis saturatioribus, unguibus nigris.

Variat parte anticâ haud flavâ, pedibusque posterioribus magìs elongatis. Fortè sexus alter.

Spec. 2. *Geophilus subterraneus.*

G. corpore flavo, capite subferrugineo.

Scolopendra subterranea. *Shaw.*

Long. Corp. 3½ unc.

Dorsum segmentis lateraliter prominulis, lineis duabus longitudinalibus abbreviatis impressis. Pedes articulis subferrugineo-tinctis. Ungues nigricantes.

In the living state this species may at all times be distinguished from the preceding, by its colour, and by the longitudinal abbreviated lines, which are only to be seen whilst the animal is alive.

I observed whilst turning over some garden earth in the month of January, a female of this species in a cavity, (apparently formed by itself,) with twenty-six young ones, which were pale yellow, with the head a little darker in colour, and the articulations of the legs slightly ferruginous.

Spec. 3.

Spec. 3. *Geophilus acuminatus.*

G. corpore toto ferrugineo antice sensim angustiore, capite anticè pedibusque dilutioribus.

Long. Corp. 1½ unc.

Habitat inter muscos rarior.

Mus. Nostr.

I first observed this interesting species on Roborough Down, near Plymouth, under a stone, and was afterwards favoured by Mr. Sowerby with several living specimens, which he received along with some moss. It has once occurred in Battersea fields amongst moss.

The antennæ were of equal diameter throughout. The anterior part of the head paler than the legs, which are slightly paler than the back.

Observation. To this division of the genus *Geophilus*, *Scolopendra electrica* of authors with two other indigenous and some exotic species belong; but as I have not had opportunities of examining the living animals, I shall at present forbear from giving any account of them.

** *Antennæ articulis valdè elongatis.*

Spec. 4. *Geophilus longicornis.*

G. corpore flavo, capite ferrugineo, antennis longioribus.

Long. Corp. 2½ unc.

Habitat prope Edinburgum et Londinum sub lapidibus.

Classis III.

Classis III. ARACHNIDES.

From this class I have not only removed the *Tetracera* and *Myriapoda* of Latreille as before mentioned, but also the *Parasita* and *Thysanoura* of the same author, which consist of genuine INSECTS; and to the ARACHNIDES I have added the genus *Nycteribia*, which agrees with them in general structure.

Subclassis I. CEPHALOSTOMATA.

Os frontale ad caput adnexum. (*Pedes* octo aut sex.)

* *Pedes coxis, femoribus, tibiis tarsisque formâ distinctis.*

Ordo I. PODOSOMATA.

Corpus 4-articulatum, et quasi e coxarum junctione efformatum. *Os* tubulosum. *Oculi* quatuor tuberculo impositi. *Pedes* octo.

Ordo II. POLYMEROSOMATA.

Corpus e serie segmentorum efformatum, abdomine haud pedunculato. *Os* mandibulis didactylis et maxillis instructum. *Oculi* duo, quatuor, sex aut octo. *Pedes* octo.

Ordo III. DIMEROSOMATA.

Corpus e segmentis duobus efformatum, abdomine pedunculato. *Os* mandibulis et maxillis armatum. *Oculi* sex aut octo. *Pedes* octo.

** *Pedes coxis, femoribus, tibiis tarsisque formâ speciali haud distinctis.*

Ordo IV. Monomerosomata.

Corpus e segmento unico efformatum. *Os* sæpius rostriforme, in nonnullis maxillis aut mandibulis instructum. *Pedes* octo aut sex.

Subclassis II. NOTOSTOMATA.

Os dorsale ad dorsum affixum. (*Pedes* sex.)

Subclassis I. CEPHALOSTOMATA.

Ordo I. Podosomata.

Obs. Fœminæ organa ovigera palpiformia, elongata, articulata, ad rostri basin prope inserta. *Pedes* coxis triarticulatis; femoribus 1-articulatis; tibiis biarticulatis; tarsis biarticulatis, *unguibus* instructis.

Fam. I. Pycnogonides.

Mandibulæ nullæ.

Gen. 1. Pycnogonum *auctorum.*

Pedes subrobusti. *Coxæ* articulis subæqualibus; *tibiæ* articulo primo longiore; *tarsi* articulo primo minimo; *ungues* simplices, validi, acuti.

Organa ovigera 10-articulata, articulo ultimo acutissimo, unguiformi, ad rostri basin segmento corporis antico annexa.

Spec. 1. *Pycnogonum Balænarum,* auctorum.

Habitat in oceano Europæo, et ad littora sub lapidibus.

Gen. 2. Phoxichilus, *Latr.*

Nymphon, *Fabr.?*

Pycnogonum, *Oth. Fabr.*

Phalangium, *Montagu.*

Pedes

Pedes gracillimi; *coxæ* articulo medio longiore subclavato; *tibiæ* articulo primo breviore; *tarsi* articulo primo minimo; *ungues* duplices, inæquales, acuti.

Organa ovigera 7-articulata, articulo ultimo tuberculiformi, in segmento antico ad rostri basin uno utrinque subtus inserta.

Ad hoc genus pertinent *Pycnogonum spinipes, Oth. Fabr. Fn. Grœn.* 232, *Nymphon hirtum, Fabr.?* et *Phalangium spinosum, Montagu, Trans. Linn. Soc.* ix. *tab.* 5. *fig.* 7.

Obs. Species multas indigenas possideo, at characteres nondum elaboravi.

Fam. II. Nymphonides.

Mandibulæ duæ, biarticulatæ, didactylæ.

Gen. 3. Ammothea.

Mandibulæ rostro multo breviores, articulis æqualibus, digitis arcuatis apice conniventibus. *Palpi* 9-articulati, articulo tertio longissimo. *Pedes* graciles; *coxæ* articulo medio longiore; *tibiæ* articulo primo subbreviore; *tarsi* articulo primo minimo; *ungues* duplices inæquales.

Organa ovigera 9-articulata, pone rostrum sub pedibus anticis fere inserta.

Spec. 1. *Ammothea carolinensis.*

Ammothea carolinensis. *Leach, Zool. Miscell.* i. 34. *t.* 13.

Habitat in Americæ mari.

Mus. Britan.

Gen. 4. Nymphon.

Nymphon, *Fabr., Latr.*

Pycnogonum. *Müll., O. Fabr.*

Phalangium. *Linn., Gmel., Mont.*

Mandibulæ rostro longiores articulis æqualibus, digitis curvatis et per totam illorum longitudinem conniventibus, ad apicem abruptiùs

ruptiùs aduncis. *Palpi* 6-articulati, articulo secundo elongato, sexto minimo. *Pedes* gracillimi; *coxæ* articulo medio longiore; *tibiæ* articulo secundo sublongiore; *tarsi* articulo primo subbreviore; *ungues* simplices.

Organa ovigera 10-articulata pone rostrum sub pedibus anticis ferè inserta.

Spec. 1. *Nymphon femoratum.*

Nymphum femoratum. *Leach, Zool. Miscell.* i. 45. *t.* 19. *f.* 2.
Habitat in mari Britannico.
Species adhuc elaborandæ.

Ordo II. Polymerosomata.

Pedes octo. *Oculi* 2, 4, 6 aut 8.

Fam. I. Sironides.

Palpi simplices. *Mandibulæ* didactylæ.

Gen. 1. Siro, *Latr.*

Spec. 1. *Siro rubens.*

Siro rubens. *Latr.*

Fam. II. Scorpionides.

Mandibulæ didactylæ. *Pedes* conformes. *Palpi* brachiiformes.

Stirps 1.

Cauda nulla. Oculi 2 aut 4.

Gen. 2. Obisium, *Illig.*

Chelifer, *Latr.*

Corpus cylindricum. *Thorax* unipartitus. *Mandibulæ* porrectæ. *Oculi* 4.

Spec. 1.

Spec. 1. *Obisium trombidioides, Latr.*

Montagu has confounded this species with another, under the title of *Acaroides**.

Gen. 3. CHELIFER, *Geoffroy.*

Corpus depressum. *Thorax* tripartitus. *Mandibulæ* breves. *Oculi* 2.

Spec. 1. *Chelifer fasciatus.*

C. manu ovatâ, abdomine segmentis margine albidis.
Habitat sub cortice arborum.

This species is mentioned by Geoffroy (*Hist. des Ins.* ii. 618.)

Stirps 2.

Cauda articulata, elongata, aculeo curvato terminata. *Oculi* 6 *aut* 8.

Gen. 4. BUTHUS.

SCORPIO *auctorum.*
Oculi octo.

Spec. 1. *Buthus occitanus, Latr.*

Gen. 5. SCORPIO, *Latr., Fabr., &c.*

Oculi sex.

Spec. 1. *Scorpio europæus, Latr.*

Fam. III. TARANTULIDES.

Mandibulæ monodactylæ. *Pedes* duo antici antennæformes, gracillimi; sex postici consimiles. *Oculi* octo. *Palpi* brachiiformes.

* Phalangium acaroides, p. 7 of this volume.

Stirps 1.

Stirps 1.

Cauda filiformis.

Gen. 6. THELIPHRONUS, *Latr.*

TARANTULA, *Fabr.*

Palpi breves, crassi, didactyli. *Corpus* oblongum, cylindricum. *Thorax* ovalis.

Stirps 2.

Cauda nulla.

Gen. 7. TARANTULA, *Fabr.*

PHRYNUS, *Oliv., Latr., &c.*

Palpi elongati, monodactyli. *Corpus* breve, depressum.

Spec. 1. *Tarantula lunata.*

T. lunata. *Fabr. Ent. Syst.* ii. 433.

Ordo III. DIMEROSOMATA.

Fam. I. SOLPUGIDES.

Oculi quatuor. *Anus* simplex.

Gen. 1. SOLPUGA, *Fabr.*

GALEODES, *Latr.*

Spec. 1. *Solpuga araneoides, Fabr.*

Fam. II. PHALANGIDES.

Oculi duo. *Anus* simplex.

Gen. 2. PHALANGIUM, *Linn., Fabr., Latr.*

OPILIO, *Herbst.*

Fam. III.

Fam. III. Araneides, *Latr.*

Oculi sex aut octo. *Anus* papillis texoriis.
Araneides. *Latr., Walck.*

For the genera of this family see *Latreille's Genera Crustaceorum et Insectorum*; and his *Considérations Générales sur l'Ordre Naturel des Crustacés, &c.*

Having been favoured with some very valuable and highly interesting remarks on the growth of the legs of a species of this family, by that learned and indefatigable naturalist Sir Joseph Banks, I take this opportunity of communicating them to the public.

As Sir J. Banks was writing at Spring Grove, on the 2d of September, one of the web-spinning species, of more than the middle size, passed over some papers on the table, holding a fly in its mouth. Much surprised to see a spider of this description walking about with its prey, and struck with somewhat unusual in the gait of the animal, he caught it, and placed it in a glass for examination; when instead of eight, he perceived that it had but three legs, which accounted for the inability of the creature to spin its web. But the curious circumstance of its having changed its usual œconomy, and having become a hunting instead of a spinning one, as well as a wish to learn whether its legs would be renewed, induced him to keep the animal in the glass, from whence it could not escape, and to observe its conduct.

On the following morning the animal ate two flies given to it, by sucking out the juices, but left the carcases whole. Two or three days after it devoured the body and head of a fly, leaving only the wings and legs. After this time it sometimes sucked and sometimes ate the fly given it. This probably depended on the state

state of the fly. At first it consumed two flies in a day, afterwards not more than one in two days. Its excrement, which it voided from the extremity of the abdomen, was at first of a milky-white colour; but afterwards the white had a black spot in the centre, of a more solid appearance than the surrounding fluid.

Soon after its confinement it attempted to form a web on the side of the vessel, but performed the business very slowly and clumsily, from the want of the proper number of legs. In about a fortnight it had completed a very small web, upon which it generally sat.

A month after having been caught, it shed its skin, leaving the slough hanging on the web. After this change five new legs appeared, not half as long as the other three legs, and of very little use to the animal in walking. These new members, however, extended themselves a little in about three days, and became half as long as the old ones: the web was now increased, and the animal continued almost immoveably sitting upon it in the day-time, unless drawn from it or attracted by a fly thrown to it as its usual provision.

Twenty-nine days afterwards it again lost its skin, leaving the slough hanging in the web, in front of a hollow cell it had woven so as to prevent it from being completely seen when lodged in it: the legs were now longer than before the change of skin, and they grew somewhat longer still in three or four days, but did not attain the size of the old legs.

The animal now increased its web, and, being put into a small bowl as a more commodious residence, soon renewed a better web than the first. In this state it was left on the 1st of November, in the hope of being found alive in the next summer, when flies re-appear, and being subjected to further observations.

On observing this animal, it appeared to this acute naturalist, that

that those organs called palpi were used by the animal in grasping and changing the position of its food whilst applied to the action of the mandibules, serving in fact the purposes of hands. Hence it occurred to Sir Joseph Banks that these parts were improperly named, and that they were really similar in function to the claws of scorpions; which opinion is firmly supported by analogy, as shall on some future occasion be shown, when the subject has undergone further examination.

Clerk calls the *palpi*, brachia, and asserts that they contain the organs of generation; an opinion entertained also by Linné, who says "*Penes in palpis gerunt;*" but, as Sir J. Banks observes, this opinion is no where supported by a statement of facts, or of anatomical examination. That the palpi of all male spiders are clavate at their extremities, every naturalist well knows; but if they really contain the sexual organs of the male, it is a circumstance of a most curious nature, and well worth the attentive examination of the physiologist; and we shall feel much obliged to any naturalist who can give any information as to the truth or falsity of this anomalous statement.

Ordo IV. Monomerosomata.

SECTIO I.

Pedes ambulatorii.

Fam. I. Trombidides.

Os mandibulis instructum. *Palpi* porrecti ad apicem appendice mobili instructi.

Stirps 1.

Oculi duo in pedunculum inserti. Corpus lineâ transversâ quasi bipartitum, parte anticâ os, oculos, pedesque quatuor anticos gerente.

Gen. 1. Trombidium, *Fabr., &c.*

Pedes octo.

Gen. 2. Ocypete.

Pedes sex.

Spec. 1. *Ocypete rubra.*

O. corpore rubro, dorso pilis longis raris pedibusque pilis brevibus plurimis rufo-cinerascentibus obtectis, oculis nigro-fuscis.

Habitat in Tipularidibus frequentissimè.

I have taken no less than sixteen specimens of this animal from one gnat.

Stirps 2.

Oculi sessiles. Corpus lineâ transversâ haud impressum.

Gen. 3. Erythræus, *Latr.*

Fam. II. Gammasides.

Os mandibulis instructum. *Palpi* porrecti simplices.

Gen. 4. Gammasus, *Latr.*

Fam. III. Acarides.

Os mandibulis instructum. *Palpi* simplices brevissimi haud porrecti.

Gen. 5. Oribita, *Latr.*

Corpus coriaceum.

Gen. 6. Acarus, *Linn., Latr.*

Corpus molle.

Fam. IV. Ixodides.

Os rostro instructum. *Oculi* absconditi aut obscuri.

Stirps 1.

Stirps 1.

Rostrum et palpi exserti.

Gen. 6. ARGAS, *Latr.*

Gen. 7. IXODES, *Latr.*

The following species (five of which are new) were described from living specimens.

Spec. 1. *Ixodes plumbeus.*

Ix. scuto cordiformi, rostro cum vaginâ pedibusque pallidè ferrugineis, abdomine plumbeo.

Long. Corp. ¼ unc.

Habitat in corpore et nido Hirundinis ripariæ.

Rostrum et vagina breves, pallidè ferrugineæ. Scutum parvum subrugulosum ferruginatum, cordiforme, margine antico angustè pallido. Coxæ pedumque articuli pallidi.

Spec. 2. *Ixodes hexagonus.*

Ix. scuto obscurè hexagono cum vaginâ pedibusque ferrugineis; abdomine testaceo-albido aut subplumbeo-pallido.

Long. Corp. 5 lin.

Habitat in Erinaceo europæo, gluteis tenaciter adhærens.

Rostrum pallidum. Vagina ferruginea, apice pallida. Clypeus fusco-ferrugineus utrinque triangulatim excavatus. Scutum saturatè ferrugineum, punctatum, lineolis duabus utrinque impressis quæ ultra medium paululum prodeunt. Pedes ferruginei, articulis apicibusque pallidis; coxæ pallidiores.

Spec. 3. *Ixodes ricinus.*

Ix. scuto rotundo minore cum vaginâ pedibusque fuscis, abdomine majore colore variante.

Acarus ricinus. *Linn., Fabr.*

Ixodes ricinus. *Latr.*

Long.

Long. Corp. ½ unc.

Habitat in canibus, arctè se affigens.

Rostrum pallide ferrugineum. Vagina ferrugineo-fusca. Clypeus utrinque lineolâ transversâ excavatâ. Scutum fuscum, rotundatum, punctatum, utrinque lineolis duabus impressis, unâ a margine antico ad medium, alterâ internâ ultra medium tendentibus. Pedes fusci, articulis apiceque pallidis.

Spec. 4. *Ixodes megathyreus.*

Ix. scuto majore obovato cum vaginâ pedibusque fuscis, abdomine rufescente.

Long. Corp. vix ¼ unc.

Habitat in canibus et in Erinaceo europæo cum præcedente frequentissimè, cujus forte mas.

Rostrum pallidè ferrugineum. Vagina fusca. Clypeus utrinque puncto transverso, excavato. Scutum majus punctatum, fuscum, anticè submarginatum, utrinque lineolis duabus impressis quæ ultra medium tendunt. Pedes fusci, apice articulisque pallidis.

Spec. 5. *Ixodes autumnalis.*

Ix. scuto ovato-subhexagono subferrugineo-fusco, vaginâ pedibusque ferrugineis: articulis albidis.

Habitat in canibus (præcipuè in illis Anglicè *Pointers* dictis) tempore autumnali, rariùs.

Vagina ferruginea, ferrugineo-fusca marginata. Clypeus utrinque excavatus. Scutum subferrugineo-fuscum. Pedes ferruginei, articulis pallidis, albidis, internè et externè subfusci. Abdomen plumbeum, lineis tribus obscurioribus impressis. Tarsi pallidi, albidi, articulis saturatioribus.

Spec. 6.

Spec. 6. *Ixodes Pari.*

Ix. scuto elongato-subhexagono fusco: disco subferrugineo-fusco, rostro ferrugineo-fusco, vaginâ fuscâ, pedibus fuscis articulis dilutioribus et albidis.

Habitat in Paro majore. Tempore autumnali, vernali.

Rostrum ferrugineo-fuscum. Vagina fusca. Clypeus utrinque obscurissimè subexcavatus. Scutum elongato-subhexagonum anticè angustius, disco pallidiore. Pedes fusci, articulis pallidis et albidis; tibiæ articulis extimis ad apicem subferrugineis; tarsi albidi, articulis obscurè subfuscis.

The *Acarus* mentioned by Montagu in his Paper on Bats (*Trans. Linn. Soc. vol.* ix.) belongs to this genus.

Stirps 2.

Rostrum et palpi absconditi.

Gen. 8. UROPODA, *Latr.*

Fam. V. CHEYLETIDES.

Os rostro instructum. *Oculi* distincti.

This tribe still requires to be examined; it contains the genera 9. *Cheyletus,* 10. *Smaris,* 11. *Bdella,* and 12. *Sarcoptes* of Latreille.

SECTIO II.

Pedes natatorii.

Fam. I. EYLAIDES.

Os mandibulis instructum.

Gen. 13. EYLAÏS, *Latr.*

Fam. II. HYDRACHNIDES.

Os mandibulis nullis.

Gen. 14.

Gen. 14. HYDRACHNA, *Müll.*, *Latr.*

Palpi porrecti, appendice mobili instructi.

Gen. 15. LIMNOCHARES, *Latr.*

Palpi incurvati, simplices.

Subclassis II. NOTOSTOMATA.

To this subclass belongs the genus *Nycteribia* of Latreille and Montagu, which I suspect will be found to constitute two very distinct genera.

XXXII. *De-*

XXXII. *Description of a Fossil Alcyonium, from the Chalk Strata near Lewes, in a Letter to A. B. Lambert, Esq. F.R.S. V.P.L.S. By Mr. Gideon Mantell, F.L.S.*

Read June 7, 1814.

DEAR SIR,

I BEG leave, with the utmost diffidence, to submit the following observations to the learned Society of which I have the honour of being a member, convinced that it will receive with indulgence any attempt to elucidate the natural history of secondary fossils.

The *Alcyonite* which forms the subject of the present communication is, I believe, peculiar to the upper or flinty chalk in the vicinity of Lewes; it never occurs in any other stratum, and there is every reason to conclude that it obtains the same situation in the hills of Wiltshire. I am not aware of any author having noticed this interesting fossil, unless the funnel-shaped fossils found by M. Guettard at Verest and Touraine, and those described in the second volume of Mr. Parkinson's admirable work on "Organic Remains," are of this species. The specimens which occur at Lewes, though generally considered as *Alcyonia*, do not entirely conform to the character of that genus as given by modern writers; yet, being evidently very nearly allied to it, the Society will, perhaps, permit me to extend the character, so as to allow these fossils a temporary admission, till future discoveries shall point out more precisely their situation in the scale of animated nature.

ALCYONIUM:

ALCYONIUM CHONOIDES*.

Funnel-like Alcyonium.

CHAR. GEN. Animal plantiforme, carnosum, gelatinosum, spongiosum, vel coriaceum, cellulis vel tubulis repletum. Superficies poris seu osculis hydras tentaculatas oviparas exserentibus, pertusa. Stirps fixa.

CHAR. SPEC. A. infundibuliforme, superficie interiore tubulorum extremitates apertas exteriore fibras reticulatas exhibente.

From an attentive examination of the mineralized remains of the *Alcyonium*, it is certain that the recent animal possessed great powers of contraction and expansion, which enabled it to assume various dissimilar forms. In a quiescent state it was more or less funnel-like, when partly expanded cyathiform, and when completely dilated it presented the figure of a broad circular disk. To this versatility of shape is to be attributed the great diversity of appearance observable in its reliquiæ, whose forms must have been derived from the contracted or expanded state of the original at the period of its introduction into the mineral kingdom. Without the knowledge of this fact, fossils originating from the same prototype are liable to be considered as distinct species, since it is by the possession of numerous specimens only that the true character of this zoophyte can be ascertained.

That the animal enjoyed the powers of contraction and expansion above ascribed to it, will appear evident from an investigation of its structure. The epidermis, or external coat, is composed of fasciculi of muscular fibres, which, arising from the pedicle, proceed in a radiated manner toward the circumference, and, by frequently anastomosing, constitute a retiform

* à χώνη, infundibulum.

plexus

plexus capable of dilating, lengthening, and contracting, according to the impressions it received. The fasciculi are further connected by lateral processes, which increase the firmness and coherence of the external integument. From the inner surface of the muscular envelopment arise innumerable tubuli, which pass direct to the ventricular cavity, and terminate in openings on its surface. In some specimens a substance of a sponge-like appearance fills up the interstices between the tubuli, and probably is the remains of a membrane, which served in the recent animal to connect the tubes and assist in strengthening and uniting the whole mass. The sides of the ventricular cavity are generally about one-third of an inch in thickness. From the basis or pedicle proceed fibres by which the animal was attached to its appropriate habitation. These facts beautifully illustrate the anatomy and physiology of the funnel-like *Alcyonium*. We find it possessing a structure, simple yet admirable, and well adapted for the purposes of its existence; an external muscular coat, which enabled it to perform its requisite motions, and a ventricular cavity with an absorbing surface, by which nutrition was effected. We have, in short, the organs which Richerand considers as characteristic of zoophytal animation. "The żoophyte, whose name indicates an animal plant, is totally separated from all beings of the vegetable kingdom, by the existence of a cavity in which alimentary digestion is carried on; a cavity by the surface of which is an absorption, an imbibition, far more active than that which takes place by the external surface of the body.—We find a tube of soft substance, sensible and contractile in all its parts. Moisture oozes from the internal surface of the tube, softens and digests the aliments which it finds there; the whole mass draws in nourishment from it; the tube then spontaneously contracts, and casts out the residue of digestion." *Richerand's Physiology*, pp. 8 and 13.

 The

The preceding remarks demonstrate that much analogy exists between the *Alcyonium Chonoides* and the "funnel-formed fossils" described by Mons. Guettard and Mr. Parkinson. Figure 5, Tab. xi. of the second volume of *Organic Remains*, approaches very nearly to this species. At page 127 it is mentioned as "being of a funnel-shape, and formed of innumerable tubuli extending horizontally from the inner to the outer surface; their bases being on the outer, and their other the open terminations, being on the inner surface." The characters of the specimen noticed p. 125 of the same volume accord very much with those of our fossil. "It was originally of a funnel-form, but has the appearance of having suffered compression, the sides of the cone being brought nearly within half an inch of each other. The texture of the external surface appears to have been very close, and without any openings, except the very minute foramina resulting from a spongeous texture. The internal surface differs much from the external, being so remarkably smooth and regular as to have the appearance of the pile of velvet. On being viewed with a lens, it is seen that the villous appearance is produced by the infinite number of minute openings, arranged as close by each other as possible over the whole surface."—The fossil represented in the frontispiece of the same book bears a striking resemblance to the *Alcyonium Chonoides.* It is, however, impossible to decide as to the identity of these fossils, without an actual inspection of the different specimens.

The annexed sketches, it is hoped, will satisfactorily prove, that nothing has been advanced respecting the structure and physiology of the *Alcyonium Chonoides* which is not fully authorized by its fossil remains. The substance of the reliquiæ is generally either calcareous or siliceous; sometimes it consists of an intermixture of both.

The specimens are from Bridgewick chalk-pit, near Lewes.

DESCRIP-

DESCRIPTION OF THE PLATES.

Tab. XXVII.

Fig. 1. *Alcyonium Chonoides*, partly expanded.

a. The tubuli arising from the outer, and terminating on the inner surface.

b. Foramina through which the radicle fibres passed. The muscular coat is not seen in this specimen; the siliceous matter which fills up its funnel-like cavity having enveloped the external surface.—A fragment of an *Echinus* is attached to the stirp, near the base.

2, 3. Flints deriving their forms from the inferior part of the stirp: *vide* Tab. XXVIII. Fig. 2.

4. Resembles figure 1. The cavity is nearly filled with silex; some of the tubular openings are visible on the internal surface.

5. Horizontal section of a flint, showing the thickness of the integuments near the base.

Tab. XXVIII.

These rare and interesting specimens beautifully illustrate the origin of the siliceous fossils delineated in the preceding plate.

Fig. 1. A mass of chalk, bearing on its superior surface the impression of the fibrous integument of *Alcyonium Chonoides*. In the centre is imbedded a flint of a funnel-shape, its margin and base possessing an appearance similar to those of the fossils before mentioned. The same description applies to Fig. 2, with this exception, that the upper part of the flint is less expanded than in Fig. 1., and assumes more of a cyathiform figure. The diffe-

 rence

rence of form observable in these flints doubtless originated from the infiltration of a greater or less proportion of silex. Thus, had the *Alcyonium*, Fig. 1. been more contracted, and the siliceous matter in sufficient quantity to impregnate the whole mass and fill up the ventricular cavity, the flint would have resembled Fig. 1. and 4. of Tab. XXVII. In Fig. 2. at *a* are shown the radicle processes passing from the base of the flint into the surrounding chalk.

Tab. XXIX.

A chalk specimen exhibiting the disciform figure of the animal when completely expanded, and the reticulated structure of its external muscular coat.

Tab. XXX.

A chalk specimen displaying the openings of the tubuli on the surface of the ventricular cavity, the animal being in a state of dilatation.

Specimens in a state of contraction strikingly resemble in form the sponge figured in Ellis's *Zoophytes, tab.* lix. *fig.* 2 : this, together with fig. 1 and 3 of the same plate, are described by Mr. Ellis as " Sponges from Otaheite ;" and it is a remarkable circumstance, that the appearance of their external surface is very similar to that of the *Alcyonium Chonoides.* The discovery of more perfect specimens, either recent or fossil, may probably at some future period enable us to trace with greater success the relation they bear to each other.

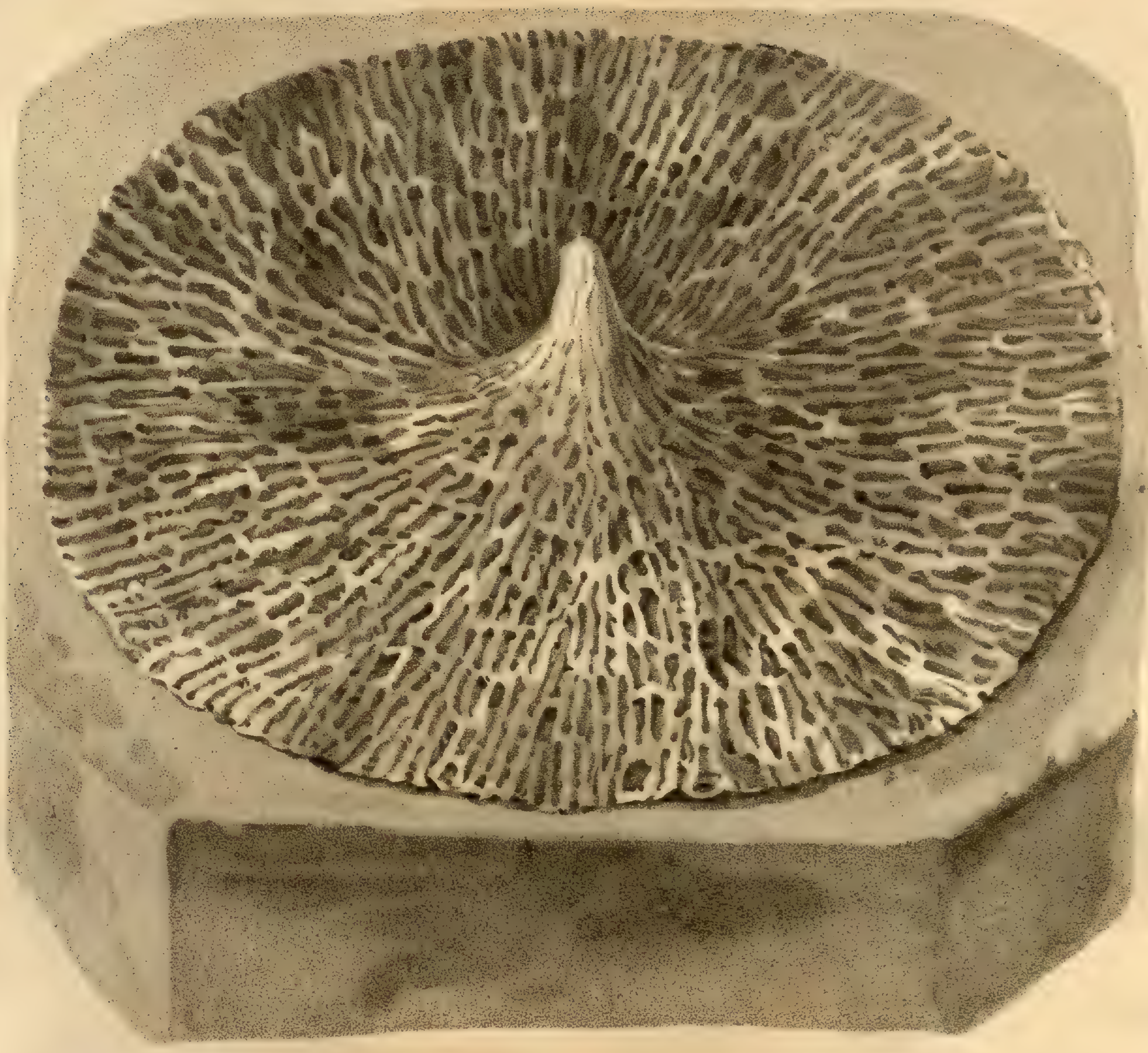
Although I dare not flatter myself that the preceding observations will add much to oryctological science, yet, as it is of the first importance that we should be extremely accurate in our reference of fossils to their prototypes, it is humbly presumed, that an attempt to prove the identity of specimens which had formerly

1
a
2
3
b
b
b
4
5

1

2

Weddell Sc.



Heddell s.

merly been considered as distinct species, will not be thought wholly uninteresting.

I am, &c.

LEWES, May 20, 1814. GIDEON MANTELL.

P.S. Many very illustrative specimens of the *Alcyonium Chonoides* have been discovered since the date of the above, all of which tend to confirm the opinions I have advanced respecting it. Some of these fossils are so highly interesting as to merit particular attention; but thinking it preferable to describe them in a future communication, rather than extend this postscript to a great length, I will only briefly notice two horizontal sections of the inferior part of the stirp, which exhibit the muscular fibres disposed in undulating plicæ, and the tubuli arising from thence, and terminating on the surface of the ventricular cavity. These sections so entirely resemble the siliceous specimen represented at tab. xii. fig. 9. of Mr. Parkinson's *Organic Remains*, that I have no hesitation in stating my conviction, that its markings are also derived from a similar cause. It is highly gratifying to me to quote Mr. Parkinson's remarks on this fossil; for although the specimen was not sufficiently illustrative to point out the particular species of *Alcyonium* from which it originated, yet with that discernment and accuracy which always distinguish his researches, he readily traced its alcyonic origin, and describes it as "being disposed in deeply-indented folds, somewhat like the heraldic nebule, and consequently must have possessed in an eminent degree the power of enlarging or diminishing the cavity which it formed, by extending and straightening, or contracting and corrugating the line in which it was placed."—*Organic Remains, vol.* ii. *p.* 145.

Sept. 28, 1815. G. M.

XXXIII. *De-*

XXXIII. *Description of nine new Species of Plants from Caucasus. By Chevalier de Steven, Counsellor of the University of Moscow.*

Read November 2, 1813.

Veronica Crista-Galli.

Tab. XXXI.

Veronica pedunculis unifloris folium æquantibus, calycibus diphyllis: foliolis bilobis serratis.

Habitat copiose in sylvis umbrosissimis Caucasi orientalis supra Kubam. Fl. Maio.

Descr. *Radix* annua tenuis ramosa.

Caulis adscendens, simplex vel subdichotomus tener utrinque pubescens, pilis patentissimis.

Folia (Veronicæ agrestis) tenera pallide viridia fere uncialia subsessilia cordata serrata obtusiuscula margine venisque ciliatis; floralia (vel bracteæ) acuta, imis majora.

Pedunculi solitarii uniflori patentes pubescentes folium æquantes aut paullo longiores; vel potius racemi pauci axillares caulem multoties superantes, bracteis foliis consimilibus.

Calyx compresso-clausus diphyllus, foliolis cordatis suborbiculatis serratis apice profunde emarginatis vel bilobis, lobis acutis margine ciliatis; florens magnitudine vix V. hederæfoliæ, fructiger excrescens in magnitudinem diametro semiuncialem.

Corolla

Linn. Trans. Vol. XI. Tab. 31. p. 410.

Veronica crista-galli.

Anchusa alpestris.

Corolla congenerum minutissima imo calyce dimidio minor, admodum fugax, pallide cœrulea.

Stamina duo corolla breviora.

Pistillum congenerum.

Capsula calyce parum brevior emarginata, margine brevissime ciliata, bilocularis loculis monospermis.

Semina magnitudine lentis, nigra rugosa altero latere umbilicata, summo loculo affixa.

Obs. Planta facie *V. agrestis*, calycibus diphyllis cristatis ab hoc genere abhorrens.

Anchusa alpestris.

Tab. XXXII.

A. floribus æqualibus, calycibus hirsutissimis quinquedentatis: dentibus obtusiusculis; fructiferis campanulatis pendulis, foliis eroso-dentatis, caulibus procumbentibus.

Habitat in Caucasi orientalis alpe Schah-dagh ad fontes rivi Fucharibasch sub ipsa nive. Fl. Junio.

Descr. *Radix* perennis? ramosa nigricans superne bi- vel trifida.

Caules plures adscendentes simplices hispidi interspersis villis, pedales et ultra.

Folia sparsa erecto-patentia biuncialia oblongo-lanceolata obtusiuscula basi attenuata inæqualiter eroso-dentata hispida setis marginalibus validioribus.

Racemi terminales conjugati apice convoluti, fructiferi elongati. *Pedunculi* florentes brevissimi, fructiferi longitudine calycis, cernui. *Bracteæ* lanceolatæ acuminatæ hispidæ.

Calyx valde hispidus pilis flavescentibus, pallide e luteo viridis, striis quinque subcœruleis, quinquedentatus dentibus lanceolatis

lanceolatis acutis, florens infundibuliformis, fructifer campanulatus subinflatus.

Corolla magnitudine Anchusæ luteæ, calyce duplo major, infundibuliformis, tubo recto ochroleuco subhyalino longitudine calycis, sub fauce coarctato, limbo flavo basi fulvo, quinquelobo lobis obtusissimis, fauce clausa squamulis quinque brevissimis barbatis.

Stamina inclusa, filamentis brevissimis, autheris linearibus bilocularibus fuscis.

Stylus staminibus brevior glaber; stigma simplex obtusiusculum.

Semina stylo haud affixa ovata venosa fusca.

Obs. Differt ab affinibus *A. ochroleuca* caule decumbente, ab *A. lutea* calycibus minus inflatis, foliis eroso-dentatis; ab utraque calycum hirsutie insigni et florum colore duplici.

Androsace albana.

Tab. XXXIII.

A. pubescens, foliis spathulatis incisis, umbellâ capitatâ.

Habitat in Caucasi orientalis summo monte Schah-dagh supra fontes rivi Fucharibasch ad nivem. Fl. Junio.

Descr. *Radix* perennis subsimplex nigricans.

Folia radicalia numerosa spathulata basi integerrima supra medium incisa vel tantummodo dentata, dentibus obtusis; utrinque glabra margine ciliata, semiunciam longa, lineas tres in medio lata.

Scapi 4-5 digitales vel palmares teretes, inferne glabri virides, superne pubescentes rubicundi lineam crassi.

Capitulum terminale multiflorum.

Involucrum capitulo brevius polyphyllum, foliolis lanceolato-linearibus obtusiusculis villosis.

Calyx

Androsace albana.

Linn. Trans. Vol. XI. Tab. 34. p. 411.

Cucubalus lacerus.

Calyx corolla dimidio brevior, campanulatus, ad medium quinquefidus laciniis ovatis obtusis ciliatis, tubo albo, limbo viridi.

Corolla hypocrateriformis tubo ovato decolore, fauce glandulis quinque clausa, limbo pallide carneo longitudine tubi, quinquepartito laciniis ovatis obtusis.

Stamina quinque inclusa, *filamentis* brevissimis medio tubo adnatis; *antheris* luteis.

Pistillum staminibus brevius, germine subgloboso, stigmate simplici.

Capsulam maturam haud vidi.

Cucubalus lacerus.

Tab. XXXIV.

C. petalis multifidis, calycibus campanulatis, foliis spathulato-ovatis, caule adscendente.

Habitat in Caucaso orientali in lapidosis ad torrentem Tengi circa thermas pagi Dshymy, et inter fragmina schistosa ad rivum Chodjal circa pagum Chinalug. Fl. Junio.

Descr. *Radix* biennis subsimplex albicans crassitie pennæ columbinæ.

Caules plures pedales et ultra, adscendentes subdichotomi pilis moniliformibus superne magis instructi sub foliis nodosi, virides altero latere purpurascentes.

Folia radicalia et infima caulina ovata in petiolum longum decurrentia ita ut potius subspathulata sint dicenda, integerrima leviter undulata carnosa utrinque pilis moniliformibus pubescentia, uncialia et sesquiuncialia; caulina superiora sensim minora amplexicaulia cordata acuta margine crispa.

Flores ex dichotomia solitarii, pedunculo folia subæquante admodum pubescente.

Calyx (Cuc. fimbriati) basi truncatus campanulatus quinquedentatus pubescens hinc rubicundus.

Corolla alba (magn. Cuc. fimbriati) unguibus subexsertis, limbo calyce paullo breviore ad medium usque in lacinias lineares angustas pulchre diviso. Coronula vix ulla ad faucem.

Stamina calyce longiora antheris fuscis.

Styli tres calycis longitudine.

Capsula globosa sessilis calyce dimidio minor.

Semina fusca reniformia.

Obs. A Cucubalo fimbriato, cui proximus, abunde distinctus caule adscendente, foliorum forma et radice tenui bienni.

Silene cæspitosa.

Tab. XXXV.

S. cæspitosa glabra, caulibus simplicissimis elongatis, petalis bifidis, calycibus clavatis tomentosis, foliis subulatis carnosis.

Habitat in rupibus Caucasi orientalis subalpini circa pagum Soygyb ditionis Kubensis. Fl. Junio.

Descr. *Radix* perennis fusca intus alba inferne simplex saxa alte penetrans, superne ramosissima cæspitosa caules numerosos exserens, more Saxifragarum.

Caules simplicissimi erecti spithamæi et ultra, teretes glaberrimi valde fragiles, nodis 4-5, superioribus remotis.

Folia radicalia plurima rosulata subulata linearia integerrima carnosa glaberrima, unciam fere longa semilineam lata, caulina duplo minora internodiis multoties breviora.

Panicula terminalis capitata dichotoma 5—10-flora floribus ex dichotomia brevissime pedicellatis, pedunculis tomentosis.

Bracteæ sub pedicello brevissimæ lineares ciliatæ.

Calyx

Silene cæspitosa.

Orobus formosus.

Calyx clavatus vix angulatus basi truncatus, quinquedentatus dentibus ovatis obtusis membranaceo-marginatis, brevissime tomentosus, supra sordide purpurascens, semiunciam longus.

Petala quinque ungue exserto lamina calyce dimidio breviore bifida ($\frac{1}{3}$) sordide viridia; coronula ad faucem minima.

Genitalia parum exserta.

Stamina 10 antheris globosis flavis.

Styli 3 longitudine staminum, fœcundati longiores.

Capsula calyce tecta trilocularis globosa magnitudine lentis; thecapodio longitudine capsulæ.

Semina matura haud vidi.

Orobus formosus.

Tab. XXXVI.

O. foliis conjugatis subcordatis, pedunculis unifloris.

Habitat rarissime in alpibus Caucasi orientalis ad fontes rivi Chodjal, inter fragmina mobilia rupium schistosorum ubi nulla alia planta viget. Fl. Junio.

Descr. *Radix* perennis filiformis fuscescens, fragmina schistosa alte penetrans.

Caules plures ramosi decumbentes filiformes superne subflexuosi, striati, glabri sicut tota planta.

Folia horizontalia petiolata conjugata ovata oblique subcordata obtusiuscula cum mucrone brevissimo, integerrima glabra glaucescentia, venis utrinque prominulis.

Petiolus foliis paulo brevior, patens, desinens in *Cirrhum* subulatum brevissimum.

Stipulæ rhomboideo-subcordatæ acutæ dentibus 3-4 brevibus, folio multoties minores.

Pedunculi axillares solitarii erecti folio longiores uniflori arista bilineari sub flore.

Calyx horizontalis basi obtusus ad medium quinquefidus laciniis lanceolatis acutis subæqualibus.

Corolla amœne purpurea tubo calycem æquante (Platylobii formosi.) *Vexillum* erecto-reflexum amplum carina duplo longius, subrotundum emarginatum cum mucrone minimo, basi plicis duabus. *Alæ* subpatentes carina parum longiores lamina subrotunda. *Carina* adscendens calyce duplo longior, bicruris apice integra acutiuscula.

Stamina diadelpha inclusa. Antheræ flavæ.

Stylus apice supra villosus.

Legumen lanceolatum glabrum polyspermum stylo (in immaturo) mucronatum, sesquiunciale.

OBS. Species omnium congenerum pulcherrima habitu prorsus alieno e foliorum forma pedunculisque strictis unifloris orto.

SERRATULA ELEGANS.

Tab. XXXVII.

S. foliis linearibus margine revolutis; inferioribus pinnatifidis, caulibus simplicissimis unifloris, calycum squamis adpressis mucronatis: extimis mucrone reflexo.

Habitat rarius in glareosis Caucasi orientalis ubi torrens Gogtschaj promontorium australe medium findens ditionem Schekengem a Schirvanensi disterminat, sub pago Dshanakbulaq. Fl. Junio.

DESCR. *Radix* valida crassitie pollicis, subsimplex varie torta, extus suberoso-squamata fuscescens, intus alba, multiceps hybernaculis densissimo tomento tectis.

Caules simplicissimi rarius basi ramosi ramis elongatis simplicibus,

Serratula elegans.

cibus, pedales striati substriati glabri vel pube vagâ brevissimâ vestiti, foliis tecti.

Folia Radicalia lanceolata pinnatifida, laciniis integerrimis linearibus margine revolutis, rigida, supra glabra subtus leviter vage pubescentia; *caulina* infima radicalibus similia dentibus brevioribus, reliqua linearia integerrima sensim minora, summa ad calycem usque imbricata.

Flores terminales solitarii subnutantes, magnitudine Serratulæ coronatæ, rosei.

Calyx subcylindricus superne haud coarctatus, squamis lanceolatis imbricatis adpressis pubescente-canis, exterioribus mucrone brevi patulo, mediis erecto, intimis longe acuminatis subinermibus purpureo-coloratis.

Receptaculum paleaceum, paleis subulatis simplicibus calyce multoties brevioribus.

Flosculi omnes fertiles calyce duplo longiores, *corollâ* tubulosâ fauce haud inflatâ, limbo quinquefido laciniis angustis linearibus erecto-patulis.

Stamina longitudine corollæ filamentis liberis, antheris medio connatis apice liberis subulatis, cœrulescentibus, basi auctis setis duabus dependentibus, tubo quadruplo brevioribus.

Stigma bifidum exsertum.

Pappus simplex plumoso-scaber inæqualis pilis exterioribus brevioribus, longitudine calycis, persistens admodum fragilis.

Semina matura haud vidi.

Obs. Similis quodammodo S. stœchadifoliæ sed floribus solitariis multo majoribus foliisque inferioribus pinnatifidis abunde distincta; a Serr. amara, quacum fortassis confudi poterit sed cui nequaquam similis, pappo scabro nec plumoso molli, &c.

Serratula

Serratula depressa.

Tab. XXXVIII.

S. subacaulis, foliis bipinnatifidis canis subtus tomentosis, calycibus subglobosis villosis: squamis laxis lanceolatis obtusiusculis.

Habitat inter fragmina calcarea in summis montibus Caucasi orientalis ditionis Kubensis inter fontes torrentium Chodjal et Karatschaj. Fl. Junio.

Descr. *Radix* perennis crassitie pennæ cygneæ, pollices 3-4 rectâ descendens dein ramosa, fusca squamosa intus alba, rupium fragmina alte penetrans.

Caules pauci brevissimi purpurei sæpius nulli.

Folia petiolata petiolo longitudine folii, formâ varia, mox interrupte bipinnatifida laciniis ovatis obtusis subæqualibus margine revolutis, mox pinnatifida laciniâ extimâ multoties majore subcordatâ; supra pulvereo-pubescentia, infra tomento-vago tecta, humistrata.

Flos radicalis sessilis, accedentibus rarius duobus vel tribus lateralibus caules brevissimos terminantibus, magnitudine et fere forma Cirsii acanthoides dilute purpureus vel albus.

Calyx villoso-canus subglobosus squamis lanceolatis acutis basi adpressis purpureis, supra medium laxis reflexo-patulis viridibus, intimis erectis coloratis.

Receptaculum paleaceum paleis subulatis simplicibus calyce multo brevioribus.

Corollulæ æquales tubo longitudine calycis filiformi, fauce inflata ovata, limbo ad medium quinquefido laciniis linearibus erecto-patulis.

Stamina corolla longiora, antheris apice liberis subulatis cœruleis,

Serratula depressa

Weddell sculp.

Orchis mutabilis.

cœruleis, basi auctis setis duabus tubo antherarum quadruplo brevioribus.

Stigma parum exsertum bifidum.

Semina matura haud vidi.

Pappus simplex plumoso-scaber inæqualis persistens, perquam fragilis, e calyce vix prominens.

Obs. Admodum affinis Serratulæ humili *Desfont.* sed differt foliis bipinnatifidis, receptaculi paleis simplicibus.

Orchis mutabilis.

Tab. XXXIX.

O. bulbis indivisis, labello amplo trilobo: lobis lateralibus brevissimis undulatis; medio elongato lineari apice bifido, perianthii foliolis conniventibus: interioribus erosis.

Habitat in silvis umbrosis circa Kubam Caucasi orientalis rarius. Fl. Junio.

Descr. *Radix:* bulbi duo ovati magnitudine avellanæ, altero sæpius deficiente.

Caulis bipedalis et ultra, erectus foliosus farctus, superne purpurascens, crassitie pennæ cygneæ.

Folia crebra oblonga, superiora lanceolata acuta sensim minora.

Racemus dimidium caulem occupans, floribus sparsis magnis purpureis vel carneis demum viridibus.

Bracteæ lanceolatæ acutæ longitudine floris excepto labello, e purpureo virides.

Perianthium: Foliola tria exteriora conniventia æqualia, summum fornicatum lateralia semicordata, omnia obtusa integerrima; *interiora* paullo breviora inclusa conniventia, oblonga obtusa, inferne eroso-dentata, in medio excisa,

latere

latere exteriore profundius, dein angustata integerrima, ita ut subtriloba appareant.

Labellum amplum unciale patens, obovatum trilobum, lobis lateralibus undulato-dentatis, medio deflexo longissimo lineari apice oblique torto bifido, saturatius tincto. Ad basin labii sulcus profundus desinens in *calcar* conicum obtusum subcurvum germine paullo brevius.

Columna genitalium petalis dimidio brevior, purpurea basi et apice callo viridi.

Anthera bilocularis, pollinibus viridibus longe pedicellatis deciduis.

Stigma perpendiculare magnum rotundum mucilagine tectum.

Germen semiunciale parum tortum viride.

Capsulam maturam haud vidi.

Obs. Planta spectabilis ab omnibus congeneribus distinctissima, quodammodo ad O. hircinam accedens.

XXXIV. Ex-

XXXIV. Extracts *from the* Minute-Book *of the* Linnean Society *of* London.

April 2, 1811. Mr. Lambert, V.P.L.S., communicated to the Society, in reference to his Account of the *Herbarium* of Pallas, *Linn. Trans. vol.* x. *p.* 259, that on looking over the genus *Serratula* of that *Herbarium* he has found a species which is there named *Serratula salsa*, and which appears to answer to Pallas's Description of the *Planta salsa*, mentioned in the Appendix to his Travels through the Russian Empire.—Georgi, in his Flora of Russia, *p.* 1220, quotes for it *Pallas's Travels, vol.* i. *p.* 502.

June 18. Read a Letter from Thomas Mantell, Esq., F.L.S., to the Secretary, containing an account of an extraordinary instance of the preservation of animal life without food, in the case of a Pig, which was buried in its stye by the fall of a part of the Chalk Cliff, under Dover Castle, on the 14th of December last.

The following is an Extract from Mr. Mantell's Letter:

"On the 23d of May, 160 days after the accident, I was told that some of the workmen employed in removing the fallen chalk had heard the whining of the Pig; and although I had great doubt of the fact, I encouraged them to proceed in clearing away the chalk from the

stye under the direction of the owner, Mr. Poole, who was present. I was soon afterwards surprised to see the Pig alive, extricated from its confinement. Its figure was extremely emaciated, having scarcely any muscles discernible, and its bristles were erect, though not stiff, but soft, clean, and white. The animal was lively, walked well, and took food eagerly. At the time of the accident it was fat, and supposed to have weighed about 160 pounds, but it now weighed no more than 40 pounds. I am assured, that at the time of the fall there was neither food nor water in the stye, which is a cave about six feet square, dug in the rock, and boarded in the front; and the whole was covered about thirty feet deep in the fallen chalk. The door and other wood in front of the stye had been much nibbled, and the sides of the cave were very smooth, having apparently been constantly licked for obtaining the moisture exuding through the rock. There was no doubt that some of the loose chalk in front had been eaten; and from the appearance of the excrement, it may be conjectured that it had passed more than once through the intestines."

April 20, 1813. Mr. Bullock, F.L.S., exhibited a fine specimen of a fossil Turtle lately found at the depth of nearly one hundred feet from the surface, in a quarry about half a mile from Swanage, in the Isle of Purbeck. Mr. Bullock states, in a Letter to the Secretary, which accompanied this specimen, that a short time after it was found, another was discovered near the same place, but it was broken to pieces in the attempt to separate it from the rock.

Nov. 2.

Nov. 2. Dr. Leach, F.L.S., presented to the Society a series of what he considers one species of insect, and which he proposes to name *Phasia variabilis,* including *Conops subcoleoptratus* of Linnæus, *Thereva subcoleoptrata, hemiptera,* and *crassipennis* of Fabricius, all of which he considers merely sexual distinctions and varieties.

CATALOGUE

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N. B. To Books which are Continuations of Works included in any of the former Parts of the Catalogue, the original Numbers are here affixed; and the other Books are numbered in regular Progression.

718. Acharii (E.) Lichenographia Universalis. Gottingæ, 1810, 4to.
719. Barton's (B. S.) Facts, Observations, and Conjectures, relative to the Generation of the Opossum of North America. Philadelphia, 1806, 8vo.
720. ——— Additional Facts, Observations, and Conjectures, relative to the Generation of the Opossum of North America. Philadelphia, 1813, 8vo.
721. Beaufoy's (H. H. B.) Journal kept during an Aërial Voyage with Mr. James Sadler, sen. August 29, 1811. London, 1814, 8vo.
722. Berzelius (J. J.) An Attempt to establish a pure scientific System of Mineralogy: translated from the Swedish by John Black. London, 1814, 8vo.
723. Bonpland (A.) Description des Plantes Rares, cultivées à Malmaison et à Navarre. Livraisons 1—5. Paris, 1813—15, fol.
724. Brookes's (S.) Introduction to the Study of Conchology. London, 1815, 4to.
725. Brown's (R.) General Remarks on the Botany of Terrâ Australis. London, 1814, 4to. with Atlas fol.
726. Buchan's (A. P.) Bionomia. London, 1811, 8vo.
727. Chevalier's (T.) History of an extraordinary Enlargement of the Right Lower Extremity. London, 1813, 8vo.
675. Clark's (B.) Dissertation on the Foot of the Horse, part 2. London, 1812, 4to.
728. Clusii (Car.) Rariorum Plantarum Historia. Antverpiæ, 1601, fol.
729. D'Argenville. Conchyliologie, troisieme edit., par M. M. de Favanne, 2 tom. Paris, 1780, 4to.

730. Davies's (H.) Welsh Botanology, part 1. London, 1813, 8vo.
731. De Candolle (A. P.) Theorie Elementaire de la Botanique. Paris, 1813, 8vo.
732. ——————— Catalogus Plantarum Horti Botanici Monspeliensis. Monspelii, 1813, 8vo.
733. Delaroche (D.) Specimen Botanicum Inaugurale, sistens Descriptiones Plantarum aliquot Novarum. Lugd. Bat. 1766, 4to.
734. Dillenii (J. J.) Historia Muscorum. Edinburgi, 1811, 4to.
735. Ferrara (F.) Memorie sopra il Lago Naftia nella Sicilia Meridionale: sopra l'Ambra Siciliana: sopra il Mele Ibleo e la Citta d'Ibla Megara: sopra Nasso e Callipoli. Palermo, 1805, 4to.
736. ——— Storia generale dell' Etna. Catania, 1793, 8vo.
737. Forster's (T.) Researches about Atmospheric Phænomena. London, 1813, 8vo.
738. ——————— 2d edition. Ib. 1815, 8vo.
739. ——— Observations on the Brumal Retreat of the Swallow, 3d edition. London, 1813, 8vo.
740. ——— On the Destructive Operation of Spiritous and Fermented Liquors on the Animal System. London, 1812, 8vo.
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746. Hull's (J.) British Flora, ed. 2d, vol. 1st. Manchester, 1808, 8vo.
747. ——— Elements of Botany, 2 vols. Manchester, 1800, 8vo.
748. Von Jacquin (N. J.) Floræ Austriacæ Icones, 5 voll. Viennæ, 1773—78, fol.
749. Kirby (W. and W. Spence's) Introduction to Entomology, vol. 1st. London, 1815, 8vo.
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755. Linnæi (Car.) Lachesis Lapponica: or A Tour in Lapland, from the original Manuscript Journal of Linnæus, published by J. E. Smith, 2 vols. London, 1811, 8vo.

756. Linnæi

756. Linnæi (Car.) Hortus Cliffortianus. Amstelædami, 1737, fol.

757. ———— Species Plantarum: curante C. L. Willdenow, tomi 4, et 1ma pars 5ti. Berolini, 1797—1810, 8vo.

758. Lister (M.) Historiæ Conchyliorum. Londini, 1685—92, fol. [Exemplar incompletum continet Observationes Manuscriptas Auctoris, quæ ad calcem editionis sequentis annexæ sunt.]

759. ——— Historiæ sive Synopsis Methodica Conchyliorum et Tabularum Anatomicarum: editio altera curante Gul. Huddesford. Oxonii, 1770, fol.

760. Low's (G.) Fauna Orcadensis: published from a Manuscript in the possession of W. E. Leach. Edinburgh, 1813, 4to.

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774. Retzius (A. J.) Tal hallit pa Kongl. Carol. Acad. Natural Kammare, d 11, Junii 1811, da framlidne von Linne's Brostbild darstades upsattes.

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438. Philosophical Transactions for 1811—14. London, 4to.

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806. Notitia Collectionis insignis Vermium Intestinalium Musei Reg. Cæs. Hist. Nat. Viennensis. Vindobonæ, 1811, 4to.

807. Svensk Botanik, vol. 1—6. Stockholm, 1804—11, 8vo.

808. Traité de l'Olivier, 2de ed. Montpelier, 1784, 8vo.

809. Catalogue of the Library of the London Institution. London, 1813, 8vo.

810. Addresses of the President and Treasurer at the First General Meeting of the Subscribers to the Hull Botanic Garden, with the Laws of the Institution. Hull, 1812, 8vo.

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The Binder is requested to observe, that as a general Title-page and a Table of Contents for the whole volume are now given, the Title-pages to the separate Parts, and the Table of Contents for Part I., are to be cancelled.

ERRATA.

Page 28, *line* 6, for *Silva* read *Sylva*
97, *line* 9, for *rejects or retains* read *reject or retain*
99, *note* *, for *fig.* 2. put *fig.* 3.
‡, for *Tab. VIII. fig.* 15. put *Tab. IX. fig.* 1.
101, *note* *, for *Tab. VIII. fig.* 15. put *Tab. IX. fig.* 1.
104, *note* §, for *Iulas*, read *Iulus*,
‖, for *Tab. VIII. fig.* 15. put *Tab. IX. fig.* 1.
110, *note* †, dele g.
111, *note* ¶, for *fig.* 2. put *fig.* 3.
115, *note* §, dele *fig.* 8. *a.*
168, *line* 18, dele comma after *Mus*
192, *line* 4 from bottom, for *have* read *has*
249, *line* 3, for *ferrugineo* read *ferruginei.*
311, *line* 23, for *quinto* read *septimo*
312, *line* 4, for *Europeo* read *Europæo*
penult, for *primo* read *secundo*
315, *line* 11, for *oculorum* read *antennarum*
319, *line* 3 from bottom, dele 31. 1.
326, *line* 13, after *Antennæ* add *externæ*
19, for *Maya* read *Maïa.*
327, *line* 22, for *biaculeata* read *biaculeatus.*
331, *line* 15, for *duobus* read *tribus*
336, *line* 14, for *infra exteriores* read *infra interiores*
20, for ALPHÆUS read ALPHEUS.
23, for PÆNEUS read PENÆUS.
337, *line* ult. for *Latr. Gen. Crust. et Insect.* 1. 46. read *Fabr. Ent. Syst.* 2. 468.
341, *line* 4, add *Galathea spinigera.*
345, *lines* 24 and 25, for *paria 2 et 3 tenuiora, alia simplicia, ungue terminata;* read *paria alia simplicia ungue terminata; 2 et 3 tenuiora;*
353, *line* 26, for *curvato, compresso.* read *curvatâ, compressâ.*
27, for CAMPECOPÆA read CAMPECOPEA.
27, for *recto, subcompresso.* read *rectâ, subcompressâ.*
361, *line* 2, for *variegato.* read *variegatus.*

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